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THE INDUSTRY'S STRENGTH

IN the year 1921 the Board of Trade published the first Return giving particulars relating to the manufacture and supply of gas by authorised gas undertakings in Great Britain. That was pursuant to the Gas Regulation Act of 1920. At that time there were very many throughout the land who believed that the gas industry had reached its zenith and that the years to come would see its decline accelerated by the onslaught of competition from electricity. The years passed by, and the industry prospered. In due course its statistical record came under the ægis of the Ministry of Fuel and Power; and it must be recorded that the Ministry gradually marshalled the facts in a better and a more comprehensive way. In the *Journal* of November 24, 1948, we gave some of the data concerning the industry contained in the Ministry's Statistical Digest for 1946 and 1947—data which indicated the remarkable progress made by the industry despite a major war and all its consequences. To some extent the figures for 1947 were in the nature of estimates, but the portents were plain. To complete the picture of 1947 we now have before us the Ministry's Return for that year, just published by H.M. Stationery Office. The present publication, for the first time, gives details in respect of non-statutory gas undertakings; it also includes as a special feature a section giving information about the manufacture and supply of gas by undertakings situated in each of the gas board areas. It is, of course, the last Return of its kind covering the working of gas undertakings under either company or municipal control. On later pages we publish extracts from it, giving as a basis for comparison the figures relating to 1929 and those for 1946 and 1947. We hope that, under nationalisation, the figures eventually published for the individual undertakings comprising the area boards will be no less detailed. We regard the future publication of these details to be of first importance in the public interest, and we would call the attention of all gas consultative councils to our contention.

Let us for the moment refer to a few of the salient figures for 1921 and contrast them with those relating to 1947—the latest authentic statistics available, though, much progress has in fact been made since December, 1947. In 1921 there were 797 authorised undertakings. These undertakings carbonised 16 mill. tons of coal (we are using approximate figures), used 1¼ mill. tons of coke for water gas making, and used 52 mill. gal. of oil for carburetting. Gas sales amounted to 229,077 mill. cu.ft., and the number of consumers was 7,559,310. In 1947, 677 authorised undertakings carbonised 22½ mill. tons of coal, used 1½ mill. tons of coke for water gas making and 171 mill. gal. of oil for carburetting or enrichment in one form or another. Sales amounted to 446,086 mill. cu.ft.; consumers numbered 11,206,194 (a reasonable figure for the number of consumers at the present time is 11¾ mill.). These statistics are the reverse of dull. They show vividly how greatly the efficiency of gas manufacture from the raw materials available has increased. They indicate equally unmistakably the ever-growing demand in Great Britain for a refined and easily controllable form of heat. Looking at the picture very broadly we see that, while in 1921 it took 16 mill. tons of coal to satisfy the requirements of 7,600,000 gas consumers, by 1947 the gas requirements of an additional 3,650,000 consumers—nearly half as many again—were met by only 6½ mill. tons of coal. True, rather more coke was used for water gas making and more oil was gasified, but this does not dim materially the light thrown by these figures on the remarkable increase in gas-making efficiency—an overall efficiency which is likely to increase under nationalisation if opportunities are handled as they should be handled and if co-operation becomes closer between the nationalised gas industry and the nationalised coal industry. And in discussing this question of efficiency of gas-making it must be borne in mind that during the past 10 years and more the gas industry has by no means had its say in the choice of coals which it would like.

To those who have worked in the gas industry during the years covered by the pre-nationalisation Return, the mass of figures set out in Section 1—what may be termed the key table—are far from prosaic. Not only do they indicate the strength, the ever-growing strength, of the industry; they stand as proof that the faith of those in the industry in 1921 and in the succeeding years has in no way been misplaced. This final pre-nationalisation Return provides incentive to further effort and even firmer faith.

INTEGRATION AND EXPERIENCE

'THE investigator who probes the mysteries of integrating gas undertakings,' stated Mr. Alexander McDonald in his paper to the North British Association, 'finds a peculiar fascination which grips him more firmly as he delves further into its depths.' Much the same sensation accompanies a delving into Mr. McDonald's paper, the title, of which, 'Organisation and Control in Group Working,' although factually true, in no way indicates its logical progression of thought and the interest with which it is sustained. The theme of this timely guide to achieving a 'group viewpoint' is, briefly, that the Gas Act has removed many of the obstacles which faced advocates of nationalisation, and that experience such as that gained by Mr. McDonald during his association with the York-Harrogate Group of undertakings is likely to serve as a guide to those at present engaged in moulding the future structure of the industry.

There are, the author suggested, four types of integration: Physical linkage with manufacture at centralised stations; physical linkage with manufacture at the pit head; joint management without physical linkage; and a combination of any or all of these methods. The final choice must be a system which ensures the cheapest possible supply to consumers, coupled with a more satisfactory service and the availability to small units of specialists, but it must be based primarily upon an estimation of the probable future demand. All four variations of the integrating scheme are examined in some detail and figures quoted to demonstrate that each method has justified itself under varying sympathetic conditions. But Mr. McDonald makes it clear that, at any rate before nationalisation, he did not regard integration as a cure-all; its introduction should be governed by an exhaustive investigation of the area, which might reveal that some other means should be adopted in preference.

Assuming that nationalisation is decided upon, the form that this takes will determine what type of organisation will be necessary. But, however administrative methods may vary according to the peculiarities of the system in question, certain fundamental principles will apply in all cases. Basing his remarks upon past practice, Mr. McDonald described how the undertakings in the group, while retaining their legal identity and producing their own balance sheets, nevertheless submerged all other facets of individuality in the formation of one co-ordinated whole. Directors of each company met as a joint board, and four non-operational group officials were appointed whose work was wholly concerned with policy and development schemes. Also in a largely administrative capacity, area managers were responsible for translating policy into practice and for purposes of publicity and contact, while the real operational officials, the engineers at each manufacturing station, were relieved of the irritating demands of general organisation. Head office was responsible for all save purely local correspondence, for ordering material, and for all accountancy and secretarial work, thus ensuring a substantial saving in manpower and avoiding unnecessary duplication. Centralised stores and repair shops, aided by co-ordinated transport, effected further economies. There are certain obvious and outstanding advantages of such a system. For example, by creating a labour pool, such work as painting, &c., could be undertaken without recourse to the always unsatisfactory temporary employment of additional men. Again, the care which can be lavished on a fruitful area by industrial specialists—a luxury impossible for a small undertaking —can produce manifold increases in business; and the same applies to publicity services.

The author is clearly aware of the dangers of over-organisation. Thus, referring to the preparation of reports, he remarked: 'It is not sufficient to submit them to a board of directors. Every official throughout the area should receive a copy which includes not only his own district, but every other district in the group, and this enables him to make comparisons.' Regular conferences at which policy was explained and suggestions exchanged were aimed at fostering a team spirit. 'They (officials) were induced to submerge their loyalties in their own department in that of their unit and finally in the wider loyalty of the group as a whole.'

This paper has a particular significance in view of Mr. McDonald's appointment to the North Eastern Gas Board as a full-time member. Although he was at pains to emphasise that details contained in his paper applied before Vesting Day and as such were not designed to apply to a nationalised industry, it need hardly be pointed out that the experience gained and the lessons learned in a scheme of group under private enterprise will be of the greatest value in determining how an area board is to function. The paper closed with these words: 'An efficiently working group cannot be brought into being over-night. It is, in fact, a process of gradual development which may be spread over several years. It consists essentially of welding together a number of heterogenous units into one complete whole. If you prefer it better, it is the gradual building-up of a very complex mosaic, which time alone can achieve.' And that, we suggest, although it is intended to apply to past methods, is no less true of the future and the attitude necessary for the smooth working of a nationalised industry.

THE SMALL WORKS

WITHIN the area covered by the Eastern Gas Board there are many small undertakings, widely scattered, ranging in output from 5 to 200 mil. cu.ft. per annum. Their future is, of course, the concern of the board and, in view of the powers conferred and the opportunities presented by nationalisation their development will be watched with great interest. Demand for gas service is beyond the capacity of these small undertakings, as at present constituted and run, to satisfy. In what way is this problem to be tackled? The position was in part realistically outlined last Saturday by Mr. J. T. Brookes, Distribution Engineer and Sales Manager of the Norwich Division, in his presidential address to the Eastern Junior Gas Association—an admirable address to put forward at a junior meeting and particularly welcome as dealing with distribution as distinct from manufacture of gas. Can these small units remain as separate economic entities? There is no facile answer to this question. Perhaps in some cases new forms of gas-

making plant will be needed. On this matter the Deputy Chairman of the board, Mr. J. H. Dyde, had something to say during the conference of the International Gas Union. Carburetted water gas may be one solution to the difficulties of the very small isolated works. Mr. Dyde referred to two small works operating in Suffolk. One of these works (68 mill. cu.ft. a year from stop-end horizontals) had a cost of gas into holder of 12.7d. a therm ; with capital charges the cost worked out at 14.5d. a therm. With carburetted water gas plant the gas could be produced at a figure per therm lower by 2d. At the other works (46 mill. cu.ft. a year, again from stop-end horizontals) the overall cost per therm was 14.7d. Here also carburetted water gas plant could make gas 2d. a therm cheaper. In one case, Mr. Dyde explained, the provision of carburetted water gas could be regarded as an interim measure pending the introduction of a bulk supply; the other works is so far from any major producing station that carburetted water gas would prove a satisfactory permanent feature. When one comes to works making, say, 5 mill. cu.ft. per annum, the manufacturers of any form of gas-making plant cannot be expected to supply an economical answer.

The aspect of the solution considered by Mr. Brookes in his address was that of physical linking-up. Much information is available on the subject, but in most cases the schemes dealt with have had favourable relationship between length of main, demand, and the size of works to be closed down. By comparison, in the Eastern area distances are great and the loads at the ends of proposed mains small. But the situation has to be faced, and Mr. Brookes is a realist. He spoke of maximum holder pressures of 3 in. W.G., and cited the instance of one works where it was discovered that the mains for the first 700 yards from the works to the town were laid in duplicate. The mains had not been laid simultaneously. In fact, the original main, on investigation, was found to be blocked up. If this case constituted distribution planning, then the word planning deserved no capital. The difficulties are apparent. Mainlaying and all other costs have increased; in spite of this, Mr. Brookes feels that in many instances the argument for linking-up is more favourable than before the war. Among the reasons he adduced are these: Due to increased demand the smaller units are in need of carbonising plant at costs which, for this item alone, would raise the capital for the undertakings to figures out of all proportion; the industry is now under common ownership, thereby removing the obstacle of the undertaking which in the past has been unwilling to give its support to any scheme of linking-up, without which support no scheme could be carried out economically; the costs of mainlaying have increased greatly, but not to the extent in the long run as labour costs generally on the works. And on this reasoning the author builds up a most interesting hypothetical case for the linking-up of five small units, in aggregate making 166 mill. cu.ft. a year, by 35 miles of main, the system incorporating the necessary pumping plant. He arrives at a a credit balance—plus good service—pointing out that any scheme for linking-up would be designed to meet an increasing demand, which increase would, at any rate up to a certain point, react favourably on the capital cost for mains and pumping plant. In any case, Mr. Brookes concluded, 'we are certainly not faced with a glowing proposition which is going to show immediate economies and reductions in the price of gas to the smaller works.' That is true. It is equally true that the duty lies before us of providing the best possible gas service in isolated rural communities. Demand in these communities exists; and it has been proved for all to see that where an efficient gas service does in fact obtain in such districts demand grows apace.

LIQUEFIED PETROLEUM GAS

LIQUEFIED petroleum gas is certainly in the news in the United States of America. During 1948 sales increased 24% over those for 1947. In 1948, 2,737 mill. gal. was delivered to consumers, and the pipeline movement to both domestic and industrial consumers is growing. The demand is great for homes, farms, institutions, and so on, beyond the limits of gas mains, and we understand that more than 25% of the gas cookers produced last year went into the liquefied petroleum gas market. The demand for water heaters, refrigerators, and space heaters running on liquefied petroleum gas increased alongside. It is estimated that there are now about 5,500,000 homes using liquefied petroleum gas and that one-third of these use the gas for space heating as well as for cooking. The use of the gas at gasworks continues its rapid increase, 1948 showing an increase of 40% over 1947. It is employed largely to augment both manufactured gas and natural gas during peak loads. At June 1 last, 195 manufactured gas companies were distributing liquefied petroleum gas to 318,100 customers.

NATIONALISATION—ANATHEMA TO F.B.I.

ADDRESSING the American Chamber of Commerce in London on Sept. 22, Sir Robert Sinclair, K.C.B., K.B.E., President of the Federation of British Industries, said the Federation stood for private or free enterprise. Nationalisation of industry in any form was anathema to it. It would continue to oppose nationalisation relentlessly, because it believed that nationalisation was contrary to common sense, and that however able individual members of nationalised industries might be the Government machine was too unwieldy to control or direct and manage industry efficiently. Unfortunately, we had already got all the corroboration anyone could ask for such assertions. And yet there were proposals for further measures of nationalisation—perhaps the height of economic folly was the proposal to nationalise the iron and steel industry, but all such proposals were bad because they made for inefficiency, which we simply could not afford. The F.B.I. stood foursquare for a healthy competitive spirit and for the maintenance, or restoration, of those incentives without which increase in productive efficiency was hamstrung. Referring to devaluation, Sir Robert said the rate of 2.80 was a staggering recognition of unpalatable facts. He had vainly hoped that steps could and would have been taken by way of disinflation to prevent so drastic an adjustment. Some of the first reaction indicated that the cause and effect of devaluation were very inadequately appreciated. A better realisation would come when people had had time to grasp the full significance of this step. In that realisation he hoped that we might get back to first principles, and recapture some of that sturdy independence of mind that our forefathers had, and think more of achievement and less of security.

NEW TOWN NEWS

IN these pages last month we made reference to the accelerated development work on new satellite towns following the delay caused by a ban on capital expenditure and by shortages of labour and materials. A report prepared by the Hemel Hempstead Development Corporation to accompany an outline plan for the new town, which has been both submitted to

the Minister of Town and Country Planning and exhibited to the present citizens, has provided us with a clearer picture of the type of development that can be expected in the next few years. According to the report the designated area for the new town is 5,910 acres, of which 1,100 acres have already been developed, and the scheme envisages increasing the existing town of 22,000 to one of a 'balanced' population of 60,000. Among the matters mentioned by the Development Corporation is that consideration has been given to a scheme of district heating for the new town as a whole. In view of the amount and type of existing development, however, this proposal has been abandoned, although district heating schemes for the new industrial area, the town centre, and parts of the residential area are being studied. That this is no academic study but a question for immediate decision is shown by the fact that work has already started on one of the residential areas under consideration, the Adeyfield neighbourhood. One hundred houses have been under construction for some time; a second project of 129 houses was started this month, and a further 125 dwellings are due for construction at the beginning of next year. It is expected that on this estate the rate of construction in 18 months' time will be 600 per year. Development of the industrial area, although slower, will see the completion of the first factory next year, and the employment of some 1,500 people in five years' time. The report also mentions that the present gasworks at Hemel Hempstead is deemed inadequate to supply the ultimate population.

PUBLIC LIGHTING ENGINEERS

CAPTAIN W. J. LIBERTY and nine of his friends interested in the improvement of public lighting met in 1923 to discuss how to further their aims. The outcome was the formation of the Association of Public Lighting Engineers, whose Silver Jubilee conference attracted 900 delegates and visitors to Llandudno this month. The hopes of the founders have been justified by results and the annual conferences have been the means of bringing together for a common purpose many members of varying interests and providing a platform for the discussion of matters vital to public lighting. Despite the inroads made by electricity approximately half the public lighting in this country is provided by the gas industry, and although the ratio of gas to electricity members has inevitably changed with the passing of the years there is still a strong body of gas engineers with complete confidence in the ability of the industry, supported as it is by the close co-operation of the manufacturers of lighting equipment, to provide really good gas lighting efficiently and economically. At the Llandudno meeting the efforts of the manufacturers were surveyed in a comprehensive paper by Mr. P. Crawford Sugg, and attention was drawn to displays of columns, lanterns, controllers, and other equipment specially laid out on the promenade lawns and in the conference halls. To those of us who live in outer suburban residential roads where nothing has been done to raise the standard of street lighting above the minimum to which the fuel crisis reduced it in 1947 it was ironical to hear of the high standards of maintenance that an enterprising gas industry is capable of providing. Perhaps it is inevitable that in a district where the local authority has, wisely or otherwise, committed itself to a policy of gradual change over from gas to electricity there should be little interest in keeping the present lights shining brightly, but it is not good publicity for gas for two-mantle lamps to be kept at one-mantle level. Despite our home environment we firmly believe in the continued ability of the gas industry to provide first-class lighting for all classes of roads.

GAS PRICE ADJUSTMENTS

BEHIND last week's brief intimation of gas price increases in Scotland and Southern England and decreases in the Commercial (ex-company) and Shoeburyness (ex-municipal) districts of the North Thames Gas Board there is a long story of budgetary examination which can have its full effects only over a long period. The Gas Act imposes on the area boards the duty not only of providing an efficient supply of gas but of securing that their revenues are not less than sufficient to meet their outgoings, taking one year with another. The income for Scotland as a whole is, and has been for some time, substantially short of expenditure, due partly to dearer coal and partly to a fall in the price of by-products in the export market, particularly tar, and the board is therefore faced with the necessity to raise the price of gas in a number of districts as from the next meter readings. Local prices will be based as far as practicable on local income and expenditure and the board will not at present seek any general equalisation. The increases, ranging from 0.6d. to 3.4d. per therm, are estimated to cover only a third of the deficit for this year, leaving a large adverse balance to be defrayed in following years. A serious factor in the Southern England area is the fact that over 50% of the coal is brought by sea and the recent decision to reduce the subsidy on coastwise coal traffic has increased the price of coal to those undertakings using sea-borne coal. Development plans have been pruned as far as practicable but a substantial amount of work must be done to bring the area board's plant up to a reasonable standard of efficiency; such work can no longer be avoided without detriment to the service which the public expects. Some undertakings have met increased operational costs by using reserves built up in former years, but these reserves can no longer be taken into consideration for revenue purposes, and as a result either a loss must be incurred or the price of gas must be raised. Increases are being made in nine of the board's 63 undertakings, all with the concurrence of the gas consultative council. The long-term aim of the area boards is so to raise the standard of efficiency and increase the total volume of gas sales as to bring about an ultimate reduction in gas prices, but the process will necessarily take time. Apart from the expense, Mr. S. E. Whitehead told the Southern Gas Consultative Council that it takes anything up to two years to secure delivery of pipes and up to five years to carry out major works developments.

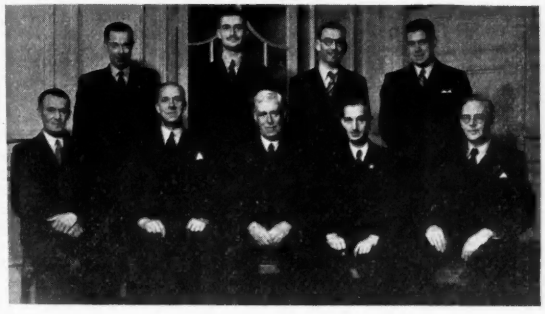
A WORD TO THE 'JUNIORS'

LEADERSHIP is probably best defined as that quality which enables a man to get the best out of those under command or 'in the team.' To inspire confidence is only one important facet of that quality, but it is essential in the early stages of team building. No leader in the great gas experiment has done more to inspire confidence than the Chairman of the East Midlands Board; and last Saturday—being President's Day of the Eastern Junior Gas Association—he had a further opportunity of allaying the doubts and encouraging the efforts of those 'young people of the right type who had entered the gas industry in all its branches.' The object of his board, said Mr. Henry Jones, was to encourage the recruitment and training of young men and women and to give those who earn it the opportunity of training and advancement—on which pronouncement he acknowledged the debt which the gas industry as a whole owes to the Institution of Gas Engineers. It was also heartening to the junior technician—profits for so many years having been manufactured solely in the retort house—to hear Mr. Jones, long in the line of gas industry tradition, deny the old tendency to regard administration and accountancy as secret matters unsuited to the build-up of the young technician. Promising men often were handicapped through insufficient training in such directions, and it was the duty of seniors to see that this did not happen. For older and younger men alike, it was good to hear Mr. Jones's recognition of the value of social gatherings and sports meetings in the knitting and humanising of an industry. Without the mixing of senior and junior, engineer and trader, wife and wife, without the excursion, the bowls, golf and the odd glass, the industry would become less generally knowledgeable and less efficient, and the planning and fulfilment of a great project might sound as hollow as the achievement of the Minister who last Monday cut a blue ribbon and helped drive an electric train out of Liverpool Street while the business men's trains queued up to enter the terminus.

Personal

MR. DAVID FULTON

An interesting ceremony took place on Sept. 14 when, as a result of attendance at the meeting the following day of the North British Association of Gas Managers, there were gathered together in Edinburgh a small band of Gas Engineers who at some time or other had served as assistant to Mr. David Fulton at Helensburgh. Mr. Fulton retired recently from the position of Engineer and Manager of the Helensburgh gas undertaking on his appointment to the Scottish Gas Board, and his assistants, past and present, took the opportunity to pay tribute to him. They met him at a private dinner party held in the North British Station Hotel at which Mr. Fulton acted as host to the following: Messrs. Thomas A. Rowan (assistant at Helensburgh 1914-24) now District Manager, Grangemouth undertaking, Scottish Gas Board; Alexander Jamieson (1924-27) now Group Manager, Greenock Group; Alexander Tran (1927-1931) now Divisional Controller, Northern Division, Southern Gas Board; Wm. C. Campbell (1931-35) now District Manager, Galashiels, Selkirk, and Melrose undertakings; David Beavis (1935-41) now Deputy Divisional Controller and Group Manager, Edinburgh and South East Division; John Kinnon (1941-46) now Deputy Manager, Dunfermline undertaking; A. B. Briggs (1946-49) at present Assistant Manager, Helensburgh undertaking; and Alexander McFadyen, present District Manager, Dumbarton and Helensburgh undertakings.



The party at the presentation comprised (back row, left to right): Messrs. D. Beavis, A. B. Briggs, John H. Kinnon and A. McFadyen; (front row) Messrs. Wm. C. Campbell, Thomas A. Rowan, David Fulton, Alex. Jamieson, and Alexander Tran.

Mr. Rowan, the eldest assistant, presented Mr. Fulton with a clock bearing an inscribed silver plate: 'To David Fulton with affection and gratitude from his assistants—1914-1949.' Mr. Rowan paid eloquent tribute to Mr. Fulton, referring particularly to his training of young men for positions of responsibility in the gas industry. Mr. Fulton, he said, dedicated his life to the service of the industry, applying himself with energy and zeal to every task. Bringing an unusual blend of talents to his striving, Mr. Fulton had become one of the most influential persons in the industry in Scotland.

Mr. Rowan was ably supported by his colleagues, who, in turn paid testimony to Mr. Fulton, recalling incidents of their Helensburgh days.

Returning thanks, Mr. Fulton said that it had given him great pleasure to entertain at dinner all his old assistants, and it was a happy circumstance that all had been able to attend. He gave thumbnail sketches of each, their special qualities, and outstanding events in their period as assistants at Helensburgh. He had tried not only to help them enlarge their knowledge and experience of gas engineering, but to teach them something of the philosophy of life. His own career in the gas industry had given him a great deal of happiness and interest but nothing in it had given him greater pleasure than his good fortune in having as assistants such able and loyal young men. Their attendance at the function had touched him deeply.

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Mr. **R. H. Rowse,** B.SC., F.INST.P., at present Senior Principal Scientific Officer at the Fuel Research Station, Greenwich, has been appointed Director of Research of Smith and Wellstood, Ltd., ironfounders, Bonnybridge, Stirlingshire.

Alderman **F. Thraves,** C.B.E., J.P. (Sheffield), has been appointed an additional member of the East Midlands Gas Consultative Council. Councillor **T. Dodman** (Godalming), Councillor **R. W. K. Edgley** (London, S.W.19), Councillor **F. J. Wingrove,** J.P. (London, S.W.8), and Mrs. **M. E. Bowden** (Carshalton), have been added to the South Eastern Gas Consultative Council.

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Mr. **Dugald M. Rowan,** Engineer and Manager at Kilwinning, has been appointed by the Scottish Gas Board to the position of Engineer and Manager of the Nairn district undertaking. From 1933 to 1942 Mr. Rowan was on the staff of the Greenock undertaking. After three years as Assistant Engineer and Manager at Troon he became Engineer and Manager at Neilston, and proceeded to Kilwinning in 1947.

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Mr. **G. A. Mallett,** who until vesting date was Chairman of the Ipswich Gas Light Company, has retained his association with the co-partnership fund of that undertaking, and is still a trustee of the fund. Attending a recent meeting of the Management Committee he completed a period of 65 years' service with the Ipswich undertaking. Entering the Company in August, 1884, as a junior clerk, he became its General Manager, until on his retirement from that office in 1941 he was appointed to the board. In 1947 he was elected Chairman and Managing Director.

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Mr. **Ronald A. Weston** was the subject of a charming tribute from the Lord Mayor of Norwich (Counc. A. E. Baines) last Saturday. The occasion was the luncheon of the Eastern Junior Gas Association, with Mr. J. T. Brookes, Distribution Engineer and Sales Manager of Norwich Division, in the Chair. The Lord Mayor said that Norwich, and indeed the whole county, were truly delighted when it became known that Mr. Weston was to remain at his old post in charge of their gas undertaking. His work was well known and appreciated in other matters besides gas, most particularly, perhaps, in the savings movement.

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Councillor **Bernard Clarke,** J.P., has received a gift from the staff and employees of the former Stamford Gas Company on relinquishing the position of Director, Engineer, Manager and Secretary of the Stamford undertaking. On the nationalisation of the industry, Mr. Clarke was appointed Manager of the South Lincolnshire Division of the East Midlands Gas Board but retained control of the local undertaking until the appointment of his successor, Mr. **C. W. F. Illingworth.** The gift, an eight-day chiming clock, was handed to Mr. Clarke by Mr. H. Burton, Chief Clerk, who said that during the 22 years Mr. Clarke had been at Stamford the capacity of the works had increased from 60 to 160 mill. cu.ft. Mr. Illingworth has been in the industry for 26 years, serving at Ramsgate, Sheppey, Coventry, and Barnoldswick.

Diary

Sept. 28-29.—Wales and Monmouthshire Association of Gas Engineers and Managers: Annual Meeting, Cardiff.

Sept. 29.—Midland Association of Gas Engineers and Managers: Visit to the works of the Midland Tar Distilleries, Ltd., Oldbury.

Sept. 29-Oct. 1.—National Smoke Abatement Society: 16th Annual Conference, Harrogate.

Sept. 30.—Manchester District Association of Gas Engineers: Visit to works of R. & J. Dempster, Ltd.

Sept. 30.—Scottish Junior Gas Association (Western District). Glasgow. Presidential Address of R. F. Bell.

Oct. 1.—Scottish Junior Gas Association (Eastern District): Meeting, Heriot-Watt College, Edinburgh. Presidential Address of S. Patterson.

Oct. 4.—Wales and Monmouthshire Junior Gas Association: Opening Meeting at Swansea. Visit to works of Mettoy Co., Ltd., Swansea Trading Estate, 2.30 p.m. Presidential Address, 4 p.m.

Oct. 5.— Western Junior Gas Association: Visit to works of Edward Cockey & Son, Ltd., Frome. Paper, 'Arc Welding as Applied to Gas Plant Maintenance,' by Murex Welding Processes, Ltd.

In Edinburgh

FIRST MEETING OF NORTH BRITISH ASSOCIATION UNDER NATIONALISATION

THE President, Mr. **D. D. Melvin** (member, Scottish Gas Board), took the chair at the 88th annual meeting of the North British Association of Gas Managers, held in Edinburgh on Sept. 15. There was a large attendance.

Extending a welcome to those present Mr. Melvin said that this was an historic year in the annals of the industry which had witnessed nationalisation. The Gas Act had wisely provided for local autonomy, and the Scottish Gas Board could legislate for local gas affairs with due regard to local conditions. They would have to adopt a new outlook on their problems, but their duty as engineers and as managers continued unchanged. Within a period of about 20 months the price of coal had been increased on no fewer than four occasions. With such a series of relatively high jumps in coal prices over such a short period and other factors, including the reluctance of some former owners to adjust gas prices prior to vesting date, sharp advances in price to cover past losses and current working costs were unavoidable. The provision of new and replacement plant to provide for the great increase in the demand for gas by domestic, commercial, and industrial consumers, and to undertake wartime replacement and renewal arrears at two or three times prewar cost were also bound to be reflected in the cost of gas-making. It would take all their ingenuity and inventiveness to overcome these difficulties, both by carbonisation technique and strategy to restrict the tonnage of coal used, and by the encouragement and extension of gas sales to spread the overhead costs of new plant over the greatest possible output.

On behalf of the Lord Provost, Magistrates, and Town Council of Edinburgh, Bailie **West Russell** extended a welcome to members of the Association. Explaining that he was deputising for the Lord Provost, he remarked that it was appropriate that the Association should hold its 88th meeting in the capital of Scotland, since their President was the last Gas Engineer and Manager employed by Edinburgh Corporation. Edinburgh had seen its efficient undertaking taken over by the Scottish Gas Board, but he was convinced that the industry had a great future before it. With the loyal co-operation of the members of the Association the Gas Board would overcome all difficulties.

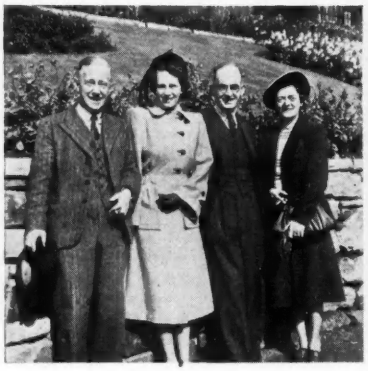
The **President** thanked Bailie West Russell for his remarks and for the help he had given in making the arrangements for the Association to meet in Edinburgh. Reference was made by the President to the death, since the last meeting, of Mr. James D. Smith, late of Belfast, a member since 1899. Mr. Smith had been President in 1909 and was made an Hon. Member in 1944.

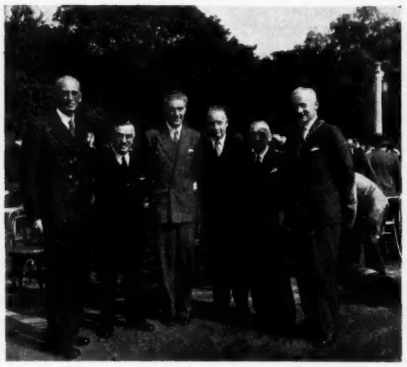
Referring to the presence of several distinguished guests the President said they were happy to have with them Mr. C. H. Chester, President of the Institution of Gas Engineers, to whom they extended their warm congratulations on his well-deserved promotion to that office and also to the post of Chairman of the South Western Gas Board. Mr. Chester was accompanied by their good friend, Dr. W. T. K. Braunholtz, the Institution Secretary. They also had with them Mr. Kelf-Cohen, representing the Ministry of Fuel and Power, and Mr. D. D. Burns, Deputy-Chairman of the Scottish Gas Board, who was also representing Sir Andrew Clow, the Chairman. The President also referred to the presence of many visitors, guests, and members from across the Border, mentioning Mr. J. T. Haynes, Mr. Noel S. Smith, Mr. Alexander Tran and Mr. Sidney Smith, Deputy-Chairman of the East Midlands Gas Board.

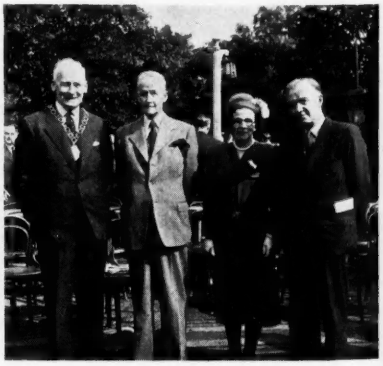
Left to right: Messrs. Athol Brown, Secretary of the North British Association, E. King, and J. B. Clay.

Mr. **C. H. Chester,** O.B.E., conveyed greetings from the Institution, saying that his visit was one of the high-lights of his term of office. The Council of the Institution always listened with great respect to its Scottish members. Domestic problems in Scotland differed from those in England, but they were all one body of gas engineers, all grouped together. There was room for detailed work in district associations. He emphasised that the Institution had not exerted any pressure to secure the merging of any district associations and they could rest assured that the Council would always give careful consideration to anything said on behalf of Scotland.

Mr . **R. Kelf-Cohen,** Director, Gas Division, Ministry of Fuel and Power, brought good wishes for a successful meeting from the Ministry and from his Department. In Scotland there were over 200 undertakings, and the responsibility for these now lay with Sir Andrew Clow and his colleagues. The







Princes Street Gardens. Left to right: Mr. J. Thew, Mrs. W. Q. Foster, Mr. and Mrs. J. S. McLaren, Dr. Braunholtz, Secretary, Institution of Gas Engineers, Messrs. R. Kelf-Cohen, Ministry of Fuel and Power, D. D. Burns, Deputy Chairman, Scottish Gas Board, C. H. Chester, President of the Institution of Gas Engineers and Chairman, South Western Gas Board, A. McDonald, Member, North Eastern Gas Board, D. D. Melvin, President, North British Association and Member, Scottish Gas Board, Dr. J. G. King, Director, Gas Research Board, Mrs. D. D. Melvin, and Mr. R. Sturrock, President-Elect, North British Association of Gas Managers.

Scottish Gas Board had a greater area than any other and it had the largest range of small and medium-sized undertakings. A great responsibility rested on the officers and members of the board. There was keen competition from electricity in Scotland but the Ministry was satisfied that the North British Association members would keep the development of the gas industry moving in Scotland.

The Secretary (Mr. Arthur T. Brown) intimated that the following had been admitted as Ordinary Members:—Douglas W. Davidson, Johnstone; Robert C. Meikle, Lasswade; and David Lambie, Coatbridge. Extra-Ordinary Members admitted were W. L. Hurdman, Director and General Manager, Parkinson Stove Company, Ltd., Birmingham; and C. Samways, Technical Manager, Robert Cort and Son, Ltd., Reading.

Following the presentation of certificates in Higher Grade Gas Engineering (Manufacture) to William Forsyth, John Harcus, James Hodgson, A. G. Kerr, J. E. Scott, J. W. Smith, W. Y. Wilson, and D. H. Webster, it was intimated that the award for the most distinguished Scottish student of the year was being divided, presentations being made by the President to Mr. James Hodgson and to Mr. J. C. Stewart, Newton-on-Ayr, the latter being the best student in the Ordinary Grade examinations.

Memorial Lecture

Dr. **J. G. King,** O.B.E., Director of the Gas Research Board, then delivered the William Young Memorial Lecture. This was published in full in last week's issue of the Journal.

Proposing a vote of thanks to Dr. King, Mr. **J. Ford,** Inverness, said that the gap between research and development to which Dr. King referred was not peculiar to the gas industry, as this question was the subject of a lengthy discussion at the recent meeting of the British Association. With the Gas Act of 1948 placing the responsibility for research squarely on the shoulders of the Gas Council, they could confidently anticipate that ample facilities both financial and otherwise would be made available not only for fundamental research but to bridge fully the gap between this and full scale development. The future of the industry largely depended on the work being carried out by Dr. King and his associates not only in this country but abroad. It had therefore been of very great interest to them to hear at first hand how some complex problems were being tackled which might yet revolutionise the entire conception of their industry; and it was with some understanding not only of their attainments but of what they had attempted and were attempting that they applauded their efforts.

Mr. **Robert Cowie,** Hawick, seconding the vote, said that in Dr. King they had a Scot in the direct line of succession to William Young. His name was a household word in the industry and it could be said of him as was said of Young that he had fertilised the industry with his ideas. There was no reason for the industry to be discouraged, particularly when research was in the capable hands of men like Dr. King, who had added distinction to their proceedings and helped them to do honour to a pioneer of whom they were justly proud.

Dr. **King,** replying, said he had been honoured in being asked twice to deliver the Young Memorial Lecture. He recalled the experimental work he had carried out in conjunction with Mr. James Jamieson and Mr. Melvin. Since he joined the Gas Research Board his association with the industry had become closer, and he hoped it would prove even more fruitful in the future.

North British golfers at Kilspindie. Left to right: Messrs. W. Kirk, Wm. C. Campbell, J. W. Broad, G. E. H. Keillor, W. S. Johnston, D. D. Burns, C. Pearson, C. H. Chester.

Following the forenoon session the **President** was host at an informal luncheon in the North British Station Hotel.

Mr. **Kelf-Cohen,** proposing the health of Mr. and Mrs. Melvin, remarked that in London they regarded Mr. Melvin as a wise and far-seeing gas engineer and a man of great principle.

During the afternoon session papers were given by Mr. **W. S. Johnston,** of Dundee, on 'The Development of the High Pressure Distribution System in Dundee,' and by Mr. **Alexander McDonald,** Member of the North Eastern Gas Board, on 'Organisation and Control in Group Working.' Mr. McDonald's paper will be found, together with a report of the discussions, on p. 786 *et seq.* Mr. Johnston's paper will be published in next week's *Journal.*

New Office Bearers

It was intimated that the new President would be Mr. Robert Sturrock (Ardrossan), with Mr. F. R. Mitchell (Lanarkshire Group) Senior Vice-President and Mr. E. G. Smith (Glasgow) Junior Vice-President.

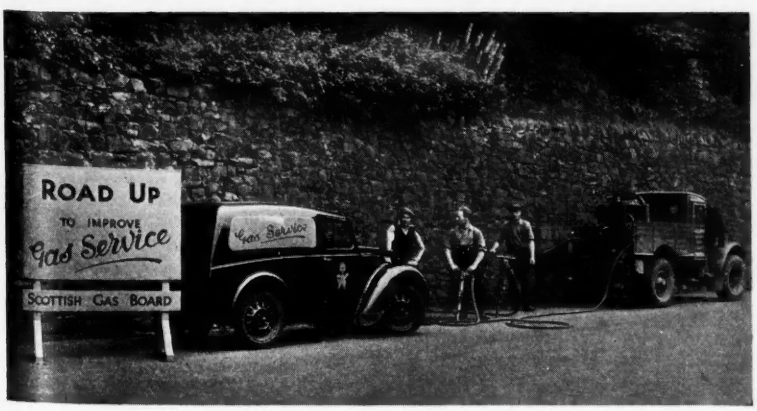
The new members of Council elected were Messrs. W. S. Johnston (Dundee) and A. McFadyen (Dumbarton).

Installing the new President, Mr. **Melvin** said he had known Mr. Sturrock for many years. It was 31 years since they came together at Dalmarnock gasworks. Mr. Sturrock had an intimate knowledge of the Association, and had served them well as Secretary for eight years. In handing on the chain of office and in placing it on the shoulders of one who had seen to it that so many other Presidents were properly garbed, he did so in the knowledge that the affairs of the Association would be well and truly guided. He could assure Mr. Sturrock of the friendly co-operation and support of all.

Mr. **Sturrock** acknowledged the honour done him. His immediate predecessors had set a high standard but he would spare no effort to maintain the traditions of the office.

Mr. **H. S. Milne,** Aberdeen, handing over a President's memento to Mr. Melvin, complimented him on the admirable manner in which he had carried out his duties in a year when he must have been occupied by many other matters.

Mr. **Melvin,** acknowledging the presentation, said that the memento would be a reminder of a most eventful year and would certainly be treasured.



The route of the coach tour on Sept. 16 crossed the line of a high pressure main now being laid along the six miles of country between Galashiels and Selkirk. The gas propaganda road sign attracted particular attention.

Messrs. R. B. Glover and D. L. Dickson

It was intimated that the spring meeting would be held on April 7, 1950, at Ardrossan, and the annual meeting in September, 1950, at Oban.

An omnibus vote of thanks was proposed by Mr. **H. A. Aitken,** Buckhaven and Leven, and was acknowledged by Mr. **Athol W. Brown,** the Secretary.

Social Events

On the evening of September 15, a Civic Reception by the Lord Provost, Magistrates, and Council of the City and Royal Burgh of Edinburgh was accorded to members in the Assembly Rooms, George Street. After the reception a dance followed and a happy

evening was enjoyed by the large company.

The Ladies' Golf Circle held their annual competition for the Handley Salver and other donated prizes over Baberton Course, Juniper Green, Edinburgh, on Sept. 14.

An excellent day's golf was enjoyed by the ladies on this beautiful upland course which is situated at the foot of the Pentland Hills and which commands very fine views of the City and the Fife coast. The following ladies were prizewinners:—Mrs. Athol Brown, 1st Handicap Prize and winner of Handley Salver, 64; Mrs. Duncan Melvin, 2nd Handicap Prize, 65, Mrs. George Keillor, 3rd. Handicap Prize, 65 (tie); Mrs. Clifford King, Scratch Prize, 79.

On Sept. 16 members with their ladies and friends left Edinburgh in motor buses for a day in the 'Scott Country.' Although the weather was dull when the party set off on the outward journey, the sun was shining when the first stop was made for a few minutes at the famous 'Sir Walter Scott's View.'

Carrying on, the party visited Dryburgh Abbey and later had lunch at the Dryburgh Abbey Hotel. Leaving Dryburgh in beautiful sunshine the route to Melrose was via Mertoun Bridge, St. Boswells Green, and Newstead. The company on reaching Melrose Abbey were conducted round the ruins, where a photograph of the party was taken. The next place to visit was Abbotsford, the historic home of Sir Walter Scott, and a pilgrimage was made to see the cast-iron retorts which at one time used to make gas at Abbotsford. A drive from Abbotsford through Walkerburn and Innerleithen brought the party to Peebles, where a stop for tea was made at the County Hotel. The return journey was made via Eddleston, Leadburn, and Penicuick.

Golf Circle

The autumn competition was held over Kilspindie Golf Course on the Wednesday. There was a record attendance, over 70 cards being taken out. A further record was almost achieved—the winning of the Challenge Bowl by the President of the Association; but Mr. Duncan Melvin, who tied for the

These three snapshots were taken during the tour of the Scott Country in the course of which the party visited Dryburgh and Melrose Abbeys.

trophy, lost by one stroke in a play-off of 5 holes. The prizewinners were as follows:—

Section 1:		
	J. Morrison	... 79 − 12 = 67
	J. M. Broad	... 75 − 5 = 70
	W. C. Hogg	... 82 − 12 = 70
Section 2:		
	D. D. Melvin	... 81 − 14 = 67
	D. Fulton	... 84 − 15 = 69
	J. B. Clay	... 86 − 16 = 70
Visitors:		
	J. P. McCrae	... 78 − 9 = 69
	T. A. Ross	... 83 − 14 = 69
	J. H. Kinnon	... 79 − 9 = 70
	Holmes Johnston	73 − 3 = 70

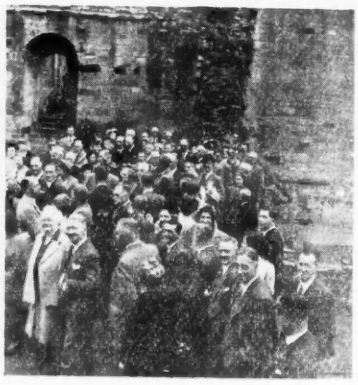
The Annual General Meeting was held after tea, the retiring Captain (Mr. Alex. Jamieson) in the Chair. It was reported that three resignations had been received, and that the current membership was 89. It was notified that for the last few years there had

Messrs. W. McRobbie and H. S. Milne.

been a financial deficit averaging £21, and this was taken care of by a unanimous decision to raise the subscription to 12s. 6d.

Mr. W. F. Ross was elected Captain for the ensuing year and Mr. Robert Sturrock Vice-Captain. Mr. W. C. Campbell was elected to the Committee. A warm welcome was extended to the visitors, notably to Messrs. C. H. Chester, Alexander Tran and J. P. McCrae.

Mrs. Melvin presented the prizes and



amid acclamation accepted a memento of the occasion. The proceedings closed with votes of thanks to the Captain, the Secretary (Mr. W. P. Rae), and to the Golf Club and staff for arrangements which could not have been bettered.

In an Address given to the Country Conference of the Chartered Institute of Secretaries at Brighton, on Sept. 24, Mr. J. R. W. Alexander, M.A., LL.B., F.C.I.S., Vice-President of the Institute, said that during the six years from 1942 to 1947 the roads of the United Kingdom had claimed in fatal accidents nearly six times the numbers of victims of industry —34,337 against 6,102. He attributed the steady decrease in industrial accidents to the appointment of 'accident' committees and 'accident' officers in factories and to the commendable activities of the Royal Society for the Prevention of Accidents.

Institution Examinations, 1949

The following is the report of the Board of Examiners of the Gas Education Committee of the Institution of Gas Engineers on the 1949 Examinations held under the Education Regulations of the Institution.

DURING the year 1948-49, the members of the Board of Examiners and Assessors, appointed by the Council, were, for the Major Courses:—

Examiners.—H. W. Moys, B.SC.(ENG.) (London), (Chairman); J. Castle, B.S.C. (Ormskirk); L. J. Clark, B.E.M., M.S.C. (London); A. D. L. Copp (London); C. A. Deas (London); W. S. Hubbard (Liverpool); W. F. Thorne, B.SC. (Poole); F. White, B.SC. (London)—Gas Engineering (Manufacture). F. L. Atkin (Birmingham); J. H. C. Bates (Cambridge); F. Bell, B.SC. (Liverpool); A. Bujnowski, M.C. (Glasgow); E. W. B. Dunning, B.SC. (London); F. W. Sansom, M.B.E. (Exeter); H. Wadsworth (Bath); J. F. Waight, B.SC.(Eng) (Birmingham)—Gas Engineering (Supply).

Assessors.—Gas Engineering (Manufacture) and (Supply). West of Scotland, J. M. Dow (Paisley); W. M. Gledhill (Stirling). East of Scotland, D. D. Melvin (Edinburgh); J. W. Napier, M.B.E. (Dunkeld).

The number of candidates entering for the examinations this year is a record, surpassing last year's total by 83 and being considerably above pre-war level. This is particularly pleasing since the number was not larger by reason of the inclusion of candidates from full-time intensive courses, no such students being entered for this year's examinations. It is also very satisfactory to observe that the percentage of internal candidates is now very high.

The Board is happy to report that, in general, there is a marked improvement in the standard as compared with last year in most grades, particularly the Ordinary Grade Gas Engineering (Supply). The Higher Grade Gas Engineering (Supply) papers, however, were not answered as well as last year's and the results in this grade were below expectations. The standard of papers submitted by external students in this grade was regrettably low.

In the Diploma examinations some very fine Home Paper answers were submitted by Manufacture candidates, but unfortunately the general level of the written answers was lower. On the Supply side, only three candidates entered and unfortunately the quality of their work was not high. No candidate in this grade was considered worthy of the Charles Hunt Memorial Medal.

Students are frequently unable to present facts clearly. This matter has been commented upon before, and the Board hopes that teachers will pay particular attention to this shortcoming. In general, the standard of sketching has been maintained although in one grade of the examinations the examiners commented adversely on the sketches submitted.

COMPARATIVE SCHEDULE OF EXAMINATION CANDIDATES

Subject	Grade	1948		1949	
		Internal	External	Internal	External
Gas Engineering (Manufacture) ...	Ordinary	102	55	140	70
	Higher	72	41	64	43
	Diploma	—	13	—	10
Gas Engineering (Supply)	Ordinary	135	61	173	68
	Higher	63	13	49	19
	Diploma	—	1	—	3
Total		372	184	426	213
Grand total		556		639	

ORDINARY GRADE GAS ENGINEERING (MANUFACTURE)
Number of candidates who sat for the Examination

Class	Internal—140		External—70		Total—210	
	No.	%	No.	%	No.	%
First with Distinction	—	—	1	1.4	1	5.0
First	14	10.0	8	11.4	22	10.4
Second	76	54.2	31	44.4	107	51.0
Fail	50	35.8	30	42.8	80	38.1

The observations quoted in last year's report as to the performance of internal candidates from the various colleges unfortunately applies this year, and an analysis of the results shows that while those entered from a few colleges have been particularly unsuccessful, other colleges have obtained very satisfactory results.

There was an increase of 53 in the number of candidates entering for the examination, the ratio of internal to external candidates being the same.

On the whole the standard achieved by candidates was better than last year, there being fewer failures and a greater number of first class passes.

The examiners are concerned that quite a large number of candidates are unable to answer the questions in grammatically correct English. The answers to many questions seem to indicate that the candidates had not had enough works or district experience.

There were six fewer candidates than for last year's examination in Higher Grade Gas Engineering (Manufacture), the ratio of internal to external candidates remaining approximately the same. There was a considerable improvement in the standard of answers submitted, especially in the case of external students, the results last year obtained by this class of entrant being particularly poor. The Board feels, however, that the general standard is still below the level expected from Higher Grade candidates and there were far too many who only managed to obtain just sufficient marks for a second class pass.

Sketching, which during the last few years has shown some improvement in general, was in this grade on the whole poor and the standard of literacy was lower than the examiners expected.

There were 10 entrants for the Diploma in Gas Engineering (Manufacture), of whom one re-sat only the Home Paper and another the written paper only. One thesis was submitted and there were eight Home Papers which included four of first class standard, one second class and three failures.

Only one thesis was submitted and this consisted of a description of the erection of a dry purification plant and related to the progress and methods used in the erection of this plant. No calculations were submitted for either the purifier structure or the foundation design and the thesis was not acceptable as presenting original work.

As with last year's examination, it was found that some candidates who had submitted really excellent Home Papers gave answers in the written examination which were of a much lower standard. In general the examiners feel that the answers to the written examination were, with two exceptions, disappointing and below that expected of Diploma candidates.

HIGHER GRADE GAS ENGINEERING (MANUFACTURE)
Number of candidates who sat for the Examination

Class	Internal—64		External—43		Total—107	
	No.	%	No.	%	No.	%
First with Distinction	—	—	—	—	—	—
First	3	4.7	1	23.0	4	3.7
Second	37	57.9	25	58.1	62	58.0
Fail	24	37.4	17	39.6	41	38.3

There were 45 more candidates than last year in the examination for Ordinary Grade Gas Engineering (Supply), most of the additional entries being due to an increase in the number of internal candidates, their number being nearly three times that of the external candidates. The general standard showed an improvement on previous years and there

were three particularly meritorious scripts which gained distinction. The percentages in first class and second class passes were both higher than last year and the number of failures 5% less. Moreover, in this grade the examiners observed an improvement in the standard of sketching.

ORDINARY GRADE GAS ENGINEERING (SUPPLY)
Number of candidates who sat for the Examination

Class	Internal—173		External—68		Total—241	
	No.	%	No.	%	No.	%
First with Distinction	3	1.7	—	—	3	1.2
First	22	12.7	16	23.5	38	15.8
Second	94	54.3	34	50.0	128	53.1
Fail	54	31.3	18	26.5	72	29.9

HIGHER GRADE GAS ENGINEERING (SUPPLY)
Number of candidates who sat for the Examination

Class	Internal—49		External—19		Total—68	
	No.	%	No.	%	No.	%
First with Distinction	—	—	—	—	—	—
First	7	14.3	1	5.3	8	11.8
Second	22	44.7	8	42.1	30	44.1
Fail	20	41.0	10	52.6	30	44.1

Most of the answers submitted by the candidates were reasonably good, particularly those in response to 'text-book' questions. Certain questions, however, were designed to examine the students' initiative, and in this respect the answers were disappointing.

In general the Board considers the performance of candidates for the Ordinary Grade Examination in Gas Engineering (Supply) this year to be satisfactory.

While it is pleasing to note that the large increase in the number of candidates of last year for the examination in Higher Grade Gas Engineering (Supply) has been substantially maintained it is a matter for regret that there is a marked falling off in the standard of the work submitted. The percentage of failures this year, especially among the external candidates, is higher than usual and in the examination as a whole the percentage of successful candidates in every class shows a decline from last year. The questions dealing with the distribution of gas were attempted by most candidates but few displayed more than a purely theoretical knowledge of the subjects chosen. The questions relating to equipment and utilisation were on the whole better answered, but here again there was evidence of a predominantly academic approach to the problems set.

Three candidates entered for the examination. One for the Diploma in Gas Engineering (Supply), who was exempted the written examination, submitted a thesis. The thesis was quite well presented and the matter submitted excellently collated, but the Board was unable to accept it, since it contained little evidence of original thought or of initial development, being in the main a collection of data abstracted from other publications.

In the written examination, both candidates exhibited sufficient knowledge to enable them to answer the questions they attempted, but the standard was poor. It was disappointing to find that no deep appreciation of any of the subjects was indicated; it is reasonable to expect that a Diploma candidate should show some expert knowledge in certain section of the examination. There are three additional points of criticism:—(1) The presentation was very poor. (2) A proper marshalling of the facts was non-existent. (3) When sketches were given they were inadequate and scrappy; more sketches could have been included with advantage.

Watford's Welfare Schemes

THE report of the Co-Partnership Committee of the former Watford and St. Albans Gas Company—covering the progress of the co-partnership, pension fund (1928), group life and pension scheme, and the life insurance scheme in the year ended March 31—records that there were 73 new entrants to the co-partnership and group life and pension schemes on Jan. 1, 1949, while seven employees were admitted to the co-partnership scheme only.

The changes in membership of the various welfare schemes during the 12 months from April 1, 1948, were as follows:

	Membership at Mar. 31, 1948	Membership at Mar. 31, 1949
Co-partnership... ...	658	737
Pension Fund (1928) ...	274	252
Group Life and Pension	342	437
Life Assurance	74	70

Allocations and transfers of stock to co-partners during the year amounted to £2,480. Co-partners' voluntary deposits to the scheme during the period totalled £4,869. A bonus of 4% per annum on basic wages and salaries was declared for the year. Interest at the same rate was paid by the Company on members' withdrawal and trust account balances. The accumulated pension fund (1928) now exceeds £262,400. Of the 109 pensioners at March 31, 1949, 13 received their pension wholly from the Company.

During the year £3,759 was invested in Savings Certificates and stamps, making a total of £46,862 saved since the inception of the Group in June, 1940.

Amounts collected during the year for charities were as follows:— St Dunstan's £53, Red Cross and St. John Ambulance Society £44, Royal London Society for Teaching and Training the Blind £1.

A pictorial presentation of the welfare accounts and reports issued with the formal statements brings out the following statistics:

The undertaking has 76,460 consumers, 1,100 employees, and 760 co-partners. The amount standing to the credit of co-partners is £25,870; British Gas Stock held by co-partners and pensioners amounts to £42,000, and stock allocated to co-partners during the year was £2,480. Bonus and interest paid was £10,970; sums paid in by co-partners during the year was £4,880; and the total bonus and interest paid to co-partners since the beginning of the scheme is £143,100.

There are 109 pensioners, and 713 co-partners are associated with the undertaking's pension funds. The Company contributed £20,980 during the year and members contributed £8,000. Employees are covered for life assurance in the sum of £133,800. Pensions paid during the year amounted to £10,970. The total paid by the Company to pension funds since 1930 was £203,480.

Birmingham W.G.C.

The Women's Gas Circle, Birmingham, now numbering over 1,050, opened the new season's activities with its annual meeting and entertainment at the Midland Institute on Sept. 8. The Lady Mayoress (Mrs. H. Humphreys) presided, and the meeting was addressed by Mr. G. le B. Diamond, C.B.E. (Chairman of the West Midlands Gas Board); Mr. J. S. Wakeford, M.B.E. (Divisional Manager of the Birmingham and District Division of the West Midlands Gas Board) and Mrs. W. M. Buchanan (Organising Secretary of the Women's Gas Council). Mr. Diamond, after welcoming delegates from other branches of the Women's Gas Council in the West Midlands Area, gave a survey of gas as a nationalised industry.

Miss O. L. Humphries, Organiser of the Circle, in her annual report recalled the many meetings and social activities which had taken place during the past year. Collections for St. Dunstan's Institution for Blinded Ex-Servicemen and Women totalled £48 11s. 9d. and cheques valued £12 and £30 had, to date, been forwarded to the Institution.

Mrs. Buchanan summarised the work of the Women's Gas Council, and an omnibus vote of thanks was proposed by Mr. Wakeford.

Following the meeting, the Birmingham School of Speech Training and Dramatic Art gave a performance of Kenneth Horne's play, 'Fools Rush In.'

News in Brief

The Telephone Number of the headquarters of the Eastern Gas Board, 2, The Abbey Garden, Westminster, S.W.1, is now TRAfalgar 5373.

A Reconstructed Battery of silica coke ovens has been brought into operation by the Cargo Fleet Iron Co., Ltd., Middlesbrough. The ovens, rebuilt by Gibbon Bros., Ltd., produce metallurgical coke for the firm's blast furnaces.

While the North British Association of Gas Managers were being entertained at a reception and dance in the Assembly rooms, George Street, Edinburgh, thieves were busy breaking into the offices of the Edinburgh gas undertaking at Calton Hill, Edinburgh. A quantity of petrol coupons and a sum of money believed to be about £100 were stolen.

The Institution of Gas Engineers has published a new grey edition, Communication No. 345/158, and a new blue edition, Communication No. 353. These are titled respectively 'An Application of the Fluidised Solids Technique to Coal Gas Purification,' by Messrs. R. H. Williamson, M.SC., and J. E. Garside, PH.D., and 'A Symposium of Short Papers,' comprising brief descriptions of developments in technique. They are available from the Institution, price 2s. 6d. and 1s. 6d. per copy respectively (post free).

The Total Output of saleable coal for the week ended Sept. 17 amounted to 4,229,100 tons, a decrease of 4,600 tons on the previous week. Tonnage lost over the same period due to stoppages, &c., went up by 29,300 tons to 72,600, of which it is calculated that disputes, mainly the Scottish strikes, accounted for 31,300 tons. Manpower figures for the week ended Sept. 10 showed a continued decline to 715,800, representing a loss of 800 during the week. The total amount of gas available at gasworks for the week ended Sept. 16 was 8,737.6 mill. cu.ft., compared with 8,675.7 mill. for the preceding week, and electricity supplies increased from 756.8 mill. units to 780.4 mill. over the same period.

Questions having been Raised regarding the ownership of gas wash boilers, cookers and other appliances consequent on nationalisation, and the responsibilities of the Town Council and the Scottish Gas Board for maintenance, the Gas Board has informed the Denny Town Council that there had been no change in policy since the Board took over. All wash boilers in Council houses with the exception of those installed by tenants at their own expense are the property of the Town Council; repairs and maintenance have been carried out by the Gas Department, new parts being charged against the housing authority. These have amounted to very little. This policy will continue to be carried out. As regards cookers, all black cookers were provided by the Department and now belong to the Board. Enamelled cookers in the schemes were provided by the Town Council and are their property. Both black and enamelled cookers will be maintained by the Board. In the case of enamelled cookers, only new parts will be charged for.

The Offices of the Professional Engineers Appointments Bureau have been moved from 13 to 9, Victoria Street, S.W.1. The telephone number (ABBey 1737) remains unaltered.

Candidates for the 1950 Associate Membership examination of the Institution of Chemical Engineers are reminded that application forms and particulars may be obtained from the Hon. Registrar at 56, Victoria Street, London, S.W.1 The application forms must be returned by Dec. 1.

The Consett Iron Co., Ltd., have decided to close down the Templetown coke works at the end of September and about 250 men have been given notice. Mr. H. Boot, Managing Director of the firm, stated that it was hoped to reabsorb about half the men who would be displaced. The main reason for closing the ovens was their age; they were built about 40 years ago and at present it was not considered economical to carry out the needed reconditioning. The ovens have been using about 4,000 tons of coal weekly.

The Autumn General Meeting of the North of England Gas Managers' Association will be held on October 7 at the Three Tuns Hotel, New Elvet, Durham. Proceedings will open at 11.30 a.m. with an official welcome by Mr. E. Crowther, Chairman of the Northern Gas Board. There will follow the election of new members and the Presidential Address, after which the members will be guests of the President at a luncheon. The Association will then visit the Willington coke ovens of Brancepeth Gas and Coke (Strakers and Love), Ltd., where they will be received by Mr. R. R. Murray, Engineer and Manager.

A New Gasholder in Curlew Road, Jarrow-on-Tyne, is planned by the Northern Gas Board. Details of the project are being settled between the Board and the Ministry of Town and Country Planning.

A Contract for Tower Purifiers for Meadowhall Works, Sheffield, has been placed with Henry Balfour & Co., Ltd., Leven, Fife, by the East Midlands Gas Board. The plant is of a new design recently introduced under the title of tower box purifiers.

Protest against the Devaluation of gas undertakings was made by Councillor J. Gladstone at a meeting of Galashiels Town Council. The gasworks belonged to Galashiels, he said, and they should protest against the devaluation of an undertaking which was a valuable asset to the town. In this matter they would have the support of other burghs in the same position. Provost J. A. Goodall said they just had to accept this devaluation, but it was a matter which might be brought up by the Convention of Border Burghs.

The Ovens of a new coking plant to be erected at Fishburn (Co. Durham) by the Northern Coal Board will be only 250 yards from Sedgefield General Hospital. The plant will have a dual gas collecting main, costing £36,000, to prevent pollution. As a further precaution there will be apron shields between the charging car and charging ports on the ovens; the coke oven chimney will be 225 ft. high; water tube boilers are to be installed with automatically controlled stoking, and smokeless fuel will be used. Steam from the quenched coke will be carried well into the air by means of a 100 ft. tower.

Eastern Gas Consultative Council

The first meeting of the Eastern Gas Consultative Council was held at Gas Industry House on Sept. 19 under the Chairmanship of Councillor Richard Turner, who after 49 years with the gas industry, retired in March last. He explained how the council had been built up so that an equal number of representatives from local authorities and other organisations could be appointed to the five divisions into which the area has been divided.

He also referred to the great variety of charges for gas which existed and although he could not imagine that any uniformity was possible until extensive link-up schemes could be carried out he thought it was possible to design tariffs for large industrial and commercial users with greater uniformity than at present. This applied also to prepayment consumers who were not always charged a uniform price.

He regretted that the board had had to raise the price of gas at Luton, Cambridge, Peterborough, Bishops Stortford, Kings Lynn, Clacton, Chelmsford and Watford. Many undertakings had not faced up to the unpleasant task of raising prices before vesting date although in many cases they must have been aware of deficits in their revenue figures.

Sir **John Stephenson,** C.B.E., J.P., Chairman of the Eastern Gas Board, brought the greetings of the board to the council and stressed the importance of this link in the organisation which enabled the board to keep in closer touch with their consumers as a whole. He outlined the major activities from vesting day to the present time and described the board as being completely balanced, including eminent gas engineers and others well versed with the industry in all its aspects. Five new towns were being planned within the area and two large L.C.C. housing estates were occupying the planning staff in preparing schemes to meet extensions which were estimated to cover a period from six to ten years.

Mr. J. H. Dyde, Deputy Chairman of the Eastern Gas Board, also attended.

The council decided to prepare a scheme for the appointment of local committees for the five divisions and agreed to invite the Press to meetings of the gas council.

United Kingdom Gas Statistics

THE Ministry of Fuel and Power has issued a 'Return relating to Gas Undertakings in Great Britain for the Year 1947—Particulars relating to the Manufacture and Supply of Gas' in continuation of the volume covering the years 1945 and 1946 which was published in 1948. The Return is available from H.M. Stationery Office (price 3s. 6d.). For the first time full details are given of non-statutory undertakings. Other sections give information regarding the changes in the ownership of gas undertakings, coke oven gas bought, and alterations in calorific value. A special feature is a section giving information about the manufacture and supply of gas, &c., by undertakings situated in each of the gas board areas. From this important publication we extract the following particulars.

In 1947 there were 387 non-statutory gas undertakings in Great Britain. Their total sales amounted to 11,599 mill. cu.ft. The figure 387 includes 26 undertakings not primarily engaged in making or distributing gas for public supply.

Upward changes in declared calorific value were as follows:

From	To	No. of undertakings	From	To	No. of undertakings
400	460	1	460	480	1
420	450	1	460	500	4
430	450	1	470	500	1
440	450	1	475	490	1
450	460	1	480	500	1
450	475	2	500	520	2
450	485	1	500	525	1
450	500	3	525	550	1

Downward changes were as follows:

From	To	No. of undertakings	From	To	No. of undertakings
450	425	1	500	450	1
475	450	2	500	480	2
480	450	1			

The following quantities of coke oven gas were bought by authorised gas undertakings in the years mentioned:

Year	No. of purchasing undertakings	Quantity of coke oven gas bought 1,000 cu.ft.
1929	30	10,948,241
1939	49	33,010,050
1946	52	52,924,256
1947	52	53,772,247

Table 1.—Supply of Gas by Authorised Gas Undertakings

Year	Number of Authorised undertakings included in return	Materials used in making gas: Coal carbonised	Coke for water and producer gas	Oil for carburetting	Quantity of gas: Made or bought: Gas from carbonisation of coal	Water gas in separate generators	Other gas	Bought from coke ovens	Sold: Total available	To local authorities for public lamps	To pre-payment consumers	To other consumers	Total sold*
—	—	1,000 tons	1,000 tons	1,000 gall.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	Mill. cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	Mill. cu.ft.
1929	771	17,887	949	58,083	254,797,757	46,349,019	4,323,493	10,948,241	316,419	10,790,634	106,338,830	175,468,476	292,598
1939	704	18,681	547	34,033	276,610,063	27,110,452	6,580,625	33,010,050	343,311	9,729,598	117,335,875	178,545,250	313,976
1946	680	21,824	1,375	131,673	319,548,929	79,061,143	8,586,518	52,924,256	460,121	7,963,393	179,844,443	220,148,883	418,257
1947	677	21,840	1,465	170,604	322,862,892	84,463,423	13,228,313	53,772,247	474,327	5,397,889	187,253,387	230,891,319	434,487

* Includes 8,099,000 gall. of oil gasified in retorts, &c.

Table 1 (contd.)—Supply of Gas by Authorised Gas Undertakings

Year	Number of authorised undertakings included in return	Quantity of residuals made: Coke and breeze	Tar	Number of consumers: Prepayment	Other	Total	Length of gas mains
—	—	1,000 tons	1,000 gall.	—	—	—	Miles
1929	771	12,033	215,138	5 164,656	3,972,925	9,137,581	48,546
1939	704	12,160	235,257	7,425,436	3,922,339	11,347,775	66,911
1946	680	12,057	287,381	7,308,970	3,748,802	11,057,772	Not available
1947	677	11,962	297,321	7,341,999	3,864,195	11,206,194	Not available

The Statistics are Continued on p. 777

ROAD RESEARCH LABORATORY'S NEW PROCEDURE

Summarising the work of the Technical Committee of the British Road Tar Association in the current issue of *Road Tar*, the Committee's Chairman, Mr. H. C. Hitchcock, refers to the task of removing the binder from stone for analytical purposes in the laboratory, which is so often a tedious business. It is not surprising to find that the Road Research Laboratory has developed a new procedure known as the rapid (methylene chloride) method. The technique employed consists essentially in shaking, preferably by mechanical means, a suitable quantity of the sample of coated stone with such a volume of methylene chloride as will yield approximately a 2% solution of the soluble binder. When agitation is complete the solution is filtered off under pressure through porous alumina into a burette from which an aliquot portion is run into a flask. The binder is then recovered by removing the solvent under vacuum. Although the time taken is still not as short as many analysts could wish, the whole test has been very carefully checked in 10 separate laboratories with the result that it has been established that when applied to tar-macadam wearing courses it is as accurate as the hot extractor method both for repeatability of results by one operator and for reproducibility by several operators. The method can, therefore, be used with every confidence.

Table 2.—Manufacture and Supply of Gas, &c., by all Gas Undertakings in 1947, in each of the Gas Board Areas shown in the First Schedule to the Gas Act, 1948

Gas Board Area	Materials used in making gas			Quantity of residuals made		Number of consumers				
						Domestic		Industrial	Other	Total
	Coal carbonised	Coke for water and producer gas	Oil for carburetting	Coke and breeze	Tar	Ordinary	Prepayment			
	1	2	3	16	17	18	19	20	21	22
	Tons	Tons	Gall.	Tons	Gall.					
Scottish	2,259,654	75,314	7,441,844	1,118,618	34,900,237	401,407	685,646	13,089	72,867	1,173,009
Northern	680,974	54,718	6,518,714	364,366	7,301,365	154,722	430,542	4,822	37,158	627,244
North Western ...	3,612,072	158,672	21,228,867	1,935,503	51,024,795	487,338	1,138,622	15,241	85,442	1,726,623
North Eastern ...	1,305,395	73,354	9,646,373	723,772	18,518,516	266,658	499,369	12,513	36,933	815,473
East Midlands ...	1,281,513	71,102	7,892,343	669,680	18,610,433	271,391	699,939	11,815	42,317	1,025,462
West Midlands ...	2,610,500	130,697	14,270,872	1,243,718	41,451,918	227,037	699,244	10,384	45,557	982,222
Wales	526,230	43,824	3,497,160	281,244	5,742,560	75,902	302,045	1,748	23,289	402,984
Eastern	1,190,009	109,477	11,160,801	634,150	17,040,188	194,207	386,244	4,316	19,014	603,781
North Thames ...	3,590,947	339,290	48,544,497	2,159,235	45,238,576	402,156	1,215,428	17,970	110,502	1,746,056
South Eastern ...	3,058,023	186,054	15,960,850	1,798,514	34,065,245	453,323	887,600	7,975	56,807	1,405,705
Southern	1,111,105	127,642	13,709,905	604,343	15,543,469	159,767	323,547	1,455	28,680	513,449
South Western ...	1,327,347	112,955	11,892,774	733,775	16,381,091	193,227	366,754	3,833	26,794	590,608
Total : Great Britain ...	22,553,769	1,483,099	171,765,000‡	12,266,918	305,818,393	3,287,135	7,634,980	105,161	585,340	11,612,616

‡ Includes 8,343,926 mill. gall. oil gasified in retorts &c.

Table 2 (contd.).—Manufacture and Supply of Gas, &c., by all Gas Undertakings in 1947, in each of the Gas Board Areas shown in the First Schedule to the Gas Act, 1948

Gas Board Area	Quantity of gas											
	Made or bought				Sold							
	Made		Bought	Total available	Sold to other undertakings	To local authorities for public lamps	To domestic consumers		To industrial consumers	To other consumers	Total sold (Cols. 9-13)	
	Gas from carbonisation of coal	Water gas in separate generators	† Gas undertakings § Coke ovens				Ordinary	Prepayment				
	5	5	6	7	8	9	10	11	12	13	14	15
	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	1,000 cu.ft.	Therms (estimated)
Scottish	36,008,701	4,335,690	3,775,105 § 294,493†	45,450,912*	296,806	959,655	10,837,935	20,493,341	5,728,223	3,993,556	42,012,710	184,014,757
Northern	9,530,822	2,997,335	13,851,487 § 143,382†	26,879,733*	143,197	339,743	4,924,065	10,699,930	5,663,769	3,179,153	24,806,660	118,827,728
North Western	57,313,149	8,865,008	1,416,959 § 1,448,895†	69,353,136*	1,589,297	1,093,816	12,353,269	29,192,751	12,135,594	8,478,288	63,253,718	289,062,964
North Eastern	20,014,082	4,460,864	3,496,251 § 3,808,273†	28,148,033*	3,808,580	497,226	6,081,533	10,214,266	5,623,478	3,323,529	25,740,032	121,802,984
East Midlds.	18,936,545	4,456,193	23,124.143 § 1,547,306†	46,825,976*	2,094,964	518,831	6,927,411	15,443,811	15,924,641	3,844,710	42,659,404	205,520,212
West Midlds.	43,375,141	8,108,865	2,920,749 § 877,307†	61,768,467*	833,117	519,311	8,915,737	20,458,396	24,528,349	3,984,709	58,406,502	244,526,161
Wales	7,561,555	2,304,848	4,633,313 § 785,698†	14,709,337*	825,618	157,164	1,947,712	6,724,435	2,214,597	1,890,883	12,934,791	58,542,852
Eastern	17,167,970	6,342,861	370,171†	24,256,278*	295,495	164,703	6,144,928	10,203,517	3,210,226	2,038,837	21,762,211	103,954,480
North Thames	47,537,292	19,133,701	765,889 § 1,149,232†	67,963,950*	1,145,383	481,085	14,077,382	27,560,233	9,396,799	10,778,454	62,293,953	320,377,075
South Eastern	40,272,365	10,684,436	2,066,916†	51,778,432*	2,000,102	491,783	14,100,110	22,084,557	4,195,218	6,321,366	47,193,034	238,583,343
Southern	15,678,436	7,539,370	240,160†	23,360,941*	240,631	131,233	6,172,672	10,261,073	1,173,866	3,824,624	21,563,468	102,044,256
South Western	19,308,702	5,912,852	872,174†	25,926,887*	892,375	143,982	6,924,599	10,926,719	2,350,089	3,114,171	23,459,560	107,849,380
Total : Great Britain	332,704,761	85,142,023	53,983,887 §*	486,422,082	14,165,565	5,498,532	99,407,353	194,263,029	92,144,849	54,772,280	446,086,043	2,095,106,192

* Inter sales of gas among gas undertakings are excluded from Col. 6 total and from all entries in Col. 7 to avoid duplication.
During 1947 the Gas Light and Coke Company (North Thames) sold 17,849,000 cu.ft. to the Wandsworth and District Gas Company (South Eastern); the Watford and St. Albans Gas Company (Eastern) sold 1,757,000 cu.ft. to the Uxbridge, Maidenhead, Wycombe and District Gas Company (North Thames).

RECENT DEVELOPMENTS IN GAS STREET LIGHTING EQUIPMENT

Silver Jubilee of the A.P.L.E.

APPROXIMATELY half the public lighting in this country is provided by the gas industry, which took a worthy part in the proceedings at the 25th annual conference of the Association of Public Lighting Engineers at Llandudno on September 12-16. Under the title of 'Gas Street Lighting Equipment and its Recent Developments,' Mr. **P. Crawford Sugg,** B.SC., A.C.G.I., ASSOC.M. INST.GAS E., presented in the form of a paper a summary of contemporary practice in gas street lighting compiled from material submitted by leading lantern and controller makers who are members of the Society of British Gas Industries.

To provide the community with the street lighting it requires at a cost which is as low as possible, is, he said, a laudable ambition, and it is one to which both the supply industry and the manufacturers of gas street lighting equipment have devoted a great amount of time and experience over the past century. To such good effect was this experience built into the lamps that many gas street lighting installations have served the public for 50 years or more, and are still mechanically sound. Usually, durability is a virtue greatly appreciated in equipment bought with public money, but the longevity of gas street lighting equipment has often not reaped the ratepayers' blessing—rather has it resulted in the retention in service of many lighting installations which are quite obsolete, and which may convey to the public a wrong impression on the effect to be obtained with modern gas street lighting equipment. How many of the thousands who use London Bridge in the year realise that the new gas lighting installation, which now lights the bridge to a very high standard, uses only a very little more gas than the old installation?

It is of interest in approaching the problem of providing a public lighting service with resources that are necessarily limited by the claims of other public amenities, that all responsible shall be familiar with the range of modern gas lighting equipment which permits notable improvement of a service at small capital cost, and a reduction in maintenance labour charges.

The incidence of today's high labour charges is so important that the whole question of the amount of attention required by installations for a high standard of maintenance has been investigated afresh since the war, and notable improvements made in this direction.

This has been achieved without in any way jeopardising the advantages of constant lighting service which the gas source possesses.

The design and appearance of street lighting equipment, while primarily dictated by technical considerations, is particularly important, as with the closer spacing and greater mounting heights now recommended the columns and lamps tend to dominate the scene. The gas and other industries in common desire to improve the æsthetic appearance of street furniture, and within the past few months the gas industry has submitted to the Royal Fine Art Commission designs which have been passed by the Commission.

A Comprehensive Display

During the week of the conference, members and delegates had opportunities of inspecting an outdoor display of modern lamp columns to which were affixed lanterns and equipment of up-to-date design. The display was staged on the grass decorative plots extending along the Promenade which were placed at the disposal of the Association by the Llandudno Urban District Council for that purpose.

While it was not possible to see the lanterns illuminated close daylight inspection was possible, and representatives of the manufacturers were present to give further particulars. During an official inspection on the opening day there were demonstrations of Class A and Class B columns being erected and placed in position by a team using a crane and lifting tackle. A further feature of the demonstration was the display of modern tower wagons, ladders, &c., on the North Parade near the conference hall. On a piece of ground adjoining the hall there was a display of the latest types of bollards, traffic signs, &c.

In all some 80 different types of columns were erected. **Concrete Utilities, Ltd.,** originators of the concrete column for street lighting, showed a range of poles for all types of illumination with various finishes, such as the standard rubbed cement finish, rubbed Mountsorrel finish, giving a touch of colour, and types of smooth ground finish in Mountsorrel and other similar aggregates. All the columns on show were fitted with the latest type of door lock patented by the Company and claimed to be interference-proof. The **Stanton Ironworks Co., Ltd.,** now have six designs of lighting columns passed by the Royal Fine Art Commission in addition to recent designs. The new type 6G column embodies two novel features fitted at the request of the borough to which such columns were supplied—armoured glass panels in the doors to allow of illumination, and the incorporation of the borough coat of arms in the base of the column. This type was included in the range of 12 columns on display.

Simplicity of line and avoidance of superfluous embellishments were the keynotes of the range of both 15 ft. and 25 ft. mounting height columns displayed by **Spun Concrete, Ltd.** The columns, made by the centrifugal spinning process, were of dense and impermeable concrete, giving increased resistance to atmospheric conditions and reducing maintenance costs, at the same time giving a finish of pleasing appearance capable of blending with any surroundings. **Poles, Ltd.,** showed typical examples of 'Adastra' columns for both 15 ft. and 25 ft. mounting height, fitted with lanterns loaned for the occasion by various manufacturers. The columns were all hot spelter galvanised after manufacture, which is the standard finish for all 'Adastra' columns. They were provided with all the usual features for accommodating apparatus, such as access doors in the base and bracket arms or top fittings to accommodate any type of lantern.

Stewarts & Lloyds, Ltd., had on display 12 tubular steel lighting columns suitable for mounting heights of 25 ft., 15 ft., and 13 ft., adopted as standards by the manufacturers who claimed that the range exhibited covered the bulk of modern requirements. Ornamentation was not incorporated in any of the designs but it was emphasised that if required ornamentation of standard types could be supplied. The exhibits had been approved by the Royal Fine Art Commission and met the recommendations of the Ministry of Transport Departmental Committee on street lighting. 'Broadcrete' lighting columns covering main and side road requirements were shown by **Tarslag, Ltd.** Columns and brackets are ground on all faces to ensure perfect lines and prepared in fine grey floated finish, giving a uniform light-grey appearance, an even surface, and smooth ground semi-polished finish, in which the natural colour of the aggregate is exposed. Prestressed lighting columns designed to British Standard specification were displayed by **Costain Concrete Co., Ltd.,** in association with the **Durus Cast Stone Co., Ltd.**

Wide Range of Lanterns

Gas interests were well represented among the exhibitors of lanterns attached to the columns. **William Sugg & Co., Ltd.,** demonstrated a range of modern lighting units for use with low pressure gas. The Group B 'Southport' lamp, uniform in style with the double-unit lantern of that type for Group A lighting, was shown for the first time. While the double-unit 'Southport' lamp provides a powerful source suitable for main traffic routes or shopping centres, the new Group B 'Southport' lamp is designed to meet the needs of the more important roads which do not, however, justify Group A lighting. It was shown in a novel form of upright mounting equally suitable for use on new columns or for fitting to

existing columns of suitable height. Features of both lamps are the specially designed Holophane refractor plates which give even road surface brightness and good visibility without excessive glare.

William Edgar & Son, Ltd., showed their 'Eclipse' lamp with a recently designed form of mounting (registered design No. 854,926). The lamp itself, which has been manufactured for many years, is not altered except that the gas supply is taken in at right angles to the body. The main feature of this design of mounting is to facilitate installation and maintenance. Air and gas regulators and the clock controller face the same direction, *i.e.*, the ladder, which is in line with the kerb. The entire lamp can be disconnected by undoing a large top cap; the clock controller can be disconnected separately by undoing the by-pass tap and Comet igniter. **Willey & Co., Ltd.,** showed their 'Cranford' lamp for Group B lighting schemes which, when fitted with directional reflectors, gives good visibility if mounted according to the Ministry of Transport recommendations. By recent improvements, gas and air adjustments can be made from the outside of the lantern. For promenades and other positions where a more powerful unit is desired, the twin lamp 'Cranford' unit has been designed.

The 'Maxilla' range of lanterns for Group B lighting was shown by **Parkinson & Cowan (Gas Meters), Ltd.** One of the main features is the complete interchangeability of standard parts, reducing stores and maintenance costs to a minimum. The 'Maxilla' lantern is fitted with 40-faceted aluminium reflector, anodised by an improved process, with adjustability to conform to varying road widths, gradients, and bends. It is fitted with a constant pressure governor set at 25/10ths water gauge pressure which in conjunction with a specially calibrated nipple according to gas value, controls gas consumption to $2\frac{1}{2}$ cu. ft. per hour per No. 2 mantle, or $1\frac{3}{4}$ cu. ft. per hour per No. 1 mantle.

Controllers and Other Equipment

The Llandudno Promenade display included a wide range of controlling equipment. The **Horstmann Gear Co., Ltd.,** displayed as comprehensive a range of time switches as the limited space allowed. Gas controllers for street lighting and industrial purposes were exhibited, and 'Comet' ignition devices were shown. **Aspec (London), Ltd.,** showed the 'Kingsland' controller, originally designed by Mr. W. E. King, of the Gas Meter Co., Ltd., and now taken over by an associated company. Apart from the escapement (which is also British-made) the controller is wholly manufactured at Kennington. Also among leading exhibitors of control equipment was **Metropolitan Gas Meters, Ltd.,** who added the Duplex electrical time switch to their range. **Sangamo Weston, Ltd.,** the **Automatic Telephone and Electric Co., Ltd.,** the **British Foreign and Colonial Automatic Light Controlling Co., Ltd.,** (famous for its 'Gunfire' range of clock controllers), and **Venner Time Switches, Ltd.,** also participated in the comprehensive display of modern devices for the control of good lighting.

Miscellaneous equipment in the form of extending ladders, motor tower wagons, &c., also had a place in the general display. The **Ford Motor Co., Ltd.,** showed the Fordson Thames 2-ton chassis fitted with 25 ft. three-stage tower wagon, the 4-ton chassis fitted with the Allan Taylor syphon-emptying outfit, and the 10 cwt. van with the Allan Taylor service pipe vacuum clearing outfit. Two trailer power units were shown by **Shaftesbury Ladders, Ltd.,** comprising a four-section heavy duty dual purpose outfit and a light type three-section dual purpose model. **Vauxhall Motors, Ltd.,** featured their three-stage tower wagon on a Bedford 3-4 ton chassis, with Eagle equipment.

Erecon, Ltd., erection contractors specialising in street lighting installations, erected a number of the exhibition columns and during the official inspection gave a demonstration of column erection. **Gowshall, Ltd.,** as usual, displayed a number of illuminated guardposts and signs, beacon globes, and tubular steel posts and columns.

Achievement and Inspiration

IN his Presidential address at Llandudno on Sept. 13, Mr. A. S. Tapsfield (Corporation of the City of London) said that as this year marked the 25th anniversary of the inauguration it might be profitable briefly to reflect on past achievements in order to gain fresh inspiration for the future.

It will, I am certain, be agreed, he said, that the decision to form an Association, made by a small band of ten pioneers in 1923, has been abundantly justified by results, and under a succession of enthusiastic Presidents and members of the Council, it has developed into a very important body. Due acknowledgment, however, must be paid to the invaluable contributions made to the Association's progress by those who have served it so well in the capacity of Secretary in the intervening period. We recall with gratitude the untiring efforts, during the early constructional years of the first Secretary, Captain Liberty, who was succeeded by the highly esteemed and popular Hon. Secretary of the Illuminating Engineering Society, the late Mr. John Dow. We remember, too, the smooth and efficient work of the late Mr. H. O. Davies, whose responsibility for the publication of our official journal, *Public Lighting*, did much to spread the Association's gospel; and now Mr. Eric Evans carries on the excellent work in the best traditions of his predecessors.

A significant event in public lighting, not long after the Association's formation, was the publication of a British Standard Specification for Street Lighting, and no doubt many will recall the historic occasion at the Sheffield Conference in 1928 when the President, Mr. Colquhoun, persuaded a considerable number of members to act as observers during an all-night session, to test their reactions to the 51 different installations he had erected to demonstrate the various classes of the Specification. When, therefore, the Ministry of Transport Departmental Committee was appointed in June, 1934, to examine and report what steps could be taken for securing more efficient and uniform street lighting, it was befitting that Mr. Colquhoun should be asked to serve on it. The recommendations of the Committee, set out in their report of 1937, were rapidly being put into effect throughout the country, when the outbreak of war called a sudden halt to further improvements.

On a number of occasions during the past few years, the Ministry of Transport has received deputations from the Association for the expression of views on matters of policy, and it is gratifying to feel that a genuine atmosphere of goodwill has been established between the two bodies. The future will undoubtedly provide many opportunities for them both to give full expression to this spirit of co-operation.

Since its inauguration in 1924, the Association has, through its annual conferences, been the means of bringing together for a common purpose many members of varying interests, and providing a platform for the discussion of matters vital to public lighting. This interchange of views and knowledge has undoubtedly enabled many difficulties to be avoided or more easily overcome.

The Association is not lacking in appreciation of the considerable contribution to advancement made by manufacturers through the years. Lighting demonstrations and exhibitions have been arranged, at which many new developments in light sources and fittings have been displayed in complete lighting installations for the first time. Without question these have been of much assistance to members and delegates when planning improved lighting in their own areas. The attendance at our conferences of chairmen of lighting committees and other civic delegates has enabled them to obtain a fuller appreciation of the relative merits of various types of installation, as well as a better understanding of the difficulties confronting their lighting officials.

The remarkable manner in which interest in the Association and its activities has spread during the past 25 years can be judged by the fact that the first conference held in Glasgow in 1924, under the Presidency of Mr. S. B. Langlands, was attended by 70 members and 50 delegates; that held at Folkestone in 1938 attracted 250 members and 350 delegates; and at Eastbourne last year a record of over 250 members and 900 delegates were present. Our membership has now expanded to a little over

Continued on p. 784

BOOK REVIEW

An Advanced Treatise on Physical Chemistry

The first volume of a comprehensive treatise on physical chemistry, 'An Advanced Treatise on Physical Chemistry' by J. R. Partington, M.B.E., D.SC., Professor of Chemistry in the University of London, has been published by Longmans, Green and Co., Ltd., price 80s. It contains sections of mathematics, thermodynamics, kinetic theory, statistical mechanics, and wave mechanics, providing a general foundation for the whole work. Other sections deal with thermometry, high and low temperatures, and the properties of gases. The treatment lays emphasis on the experimental side, which has been rather neglected of late in some works on physical chemistry, and its wide scope makes it extremely valuable for reference purposes. The work is fully illustrated with figures of apparatus, graphs and other diagrams, and contains valuable and comprehensive collections of numerical data compiled from material not readily accessible. Among other outstanding features are very full references to the literature of the subject, both classical and recent. There are bibliographies of each topic and an extensive collection of empirical and semi-empirical formulæ of value to laboratory workers and to chemists and engineers engaged in large-scale work.

Radiovisor Coming of Age Party

On Sept. 15 **Radiovisor Parent Co., Ltd.,** of 1, Stanhope Street, London, N.W.1, held a gathering to celebrate their 21st anniversary. Practical demonstrations were given of many applications of their photo-electric and electronic control equipment, the basic principles of which depend on the fact that certain metals and combinations of metals are light-sensitive and generate a minute electric current when a ray of light falls on them. By means of suitable electric circuits and apparatus the current is then amplified and adapted to perform mechanical operations.

During the past 21 years the Company have had numerous important contracts for all types of their products. Many hundreds of miles of street lighting, both in this country and abroad, are controlled by their equipment, which automatically switches the lights on and off at dusk and daybreak; a large proportion of industrial furnaces and ovens are fitted with the Radiovisor Flamestat as a precaution against explosion due to flame failure; the industrial smoke density indicator is employed to operate alarms or actuate controls in the event of excessive smoke discharge from power stations and factory chimneys, and, in a modified form, is used to operate alarms in the event of fire. This latter application is particularly valuable for protecting products liable to spontaneous combustion, and which may smoulder for days or weeks before bursting into flames. In engineering and allied industries photo-electric equipment is used for the protection of operators using guillotines, presses, and similar types of machines, for automatic control of temperatures, and for automatic counting of moving articles.

Stretford Gas Board's Final Report

The final report of the former Stretford and District Gas Board for the year ended March 31 shows gas sales amounting to 2,481,578,900 cu. ft., an increase of 12.58 per cent. on 1947-48, following an increase of 9.25 per cent. over the preceding year. Supplies to the Altrincham undertaking totalled 184,392,700 cu. ft., an increase of some 7.7 mill. cu. ft. on the previous year, and periodic assistance was again given to the Manchester and Salford undertakings. An increase of 13.83 per cent. in direct sales to the Board's own consumers is recorded, and total output was a record in the history of the undertaking. Total domestic sales were 0.62 per cent. above those for the previous year, and 12.47 per cent. more than in 1944-45. Prepayment consumers actually purchased 0.07 per cent. less gas, but ordinary consumers took 1.62 per cent. more than in the previous year. Total gas sales for industrial purposes were 1,396,593,000 cu. ft., representing an increase over the previous year of 22.84 per cent. Mr. J. Grayston, Engineer and Manager, says that 'in an area where so much effort has in past years been concentrated on the sale of gas for industrial purposes . . . it is further evidence of the almost unlimited field in industry which is open to the gas industry.'

The Board continues to report that it has been unable to meet the demands of domestic consumers for the better class of apparatus, deliveries of refrigerators and gas fires leaving much to be desired. Incidence of purchase tax has restricted sales, particularly of gas fires and water heaters.

Total capital expenditure up to March 31 was £1,417,178, and the net outstanding debt was £635,486, equal to 44.8 per cent. of the total expenditure. The net outstanding debt is equal to £256 per mill. cu. ft. of gas sold. Assets at March 31 were £1,800,452, and liabilities £963,857, leaving an excess of assets of £836,595. The gross revenue balance for the year was £110,457, compared with £102,316, and the balance to appropriation account was £16,210, against £18,790.

Aluminium Alloys

The large number of specifications for aluminium casting alloys has been a source of confusion to both founder and engineer. Most of them were drawn up to meet the particular requirements of the aircraft industry. The British Standards Institution has recently published a revised standard—B.S. 1490—of general engineering specifications for a range of casting alloys which should be adequate for all applications. To help users to become accustomed to the new numbers, Alar, Ltd., a Technical Association of Light Alloy Refiners, have issued four data sheets which, in addition to showing the relationship between new and old specifications, summarise the compositions and properties of the alloys. The more familiar names have been retained for ease of reference.

Lighting Engineers (*Continued from p. 783*)

500, and it is very gratifying to find that more than half this number are anxious to attend our conferences.

Mr. Tapsfield referred to the progress of the Scottish and Lancashire Sections which had been formed during the past year. Judging from their initial success, it was clear that they would fulfil a great purpose in bringing together for useful discussions many concerned with public lighting in their respective areas, who were not normally able to attend the annual conference. The recent formation of the Belgian Public Lighting Commission was inspired by the experiences gained at conferences of the A.P.L.E. by M. Boereboom, the Commission's first chairman. The Association had now reached a decisive stage in its career, a situation brought about mainly by the transfer to public ownership of the gas and electrical industries, and he suggested that members should regard these changing conditions as a definite spur to further effort on the part of the Association.

The Council, in its desire to keep in step with developments which must necessarily follow such a material change in the structure of the two industries, had considered it advisable to review the rules relating to membership with a view to admitting the nationalised bodies as Group Members, as well as opening the door to full membership to those possessing the necessary qualifications, who were actively engaged in branches of science and industry closely associated with street lighting.

The conference was attended by 900 delegates and visitors. Goodwill messages were received from Mr. S. B. Langlands, the Association's first President, and from Captain W. J. Liberty, one of the founders of the Association.

The following officers were elected: *President*: Mr. A. S. Tapsfield (City of London). *Vice-President*: Mr. P. Richbell (South Eastern Gas Board). *Hon. Treasurer*: Mr. H. C. Brown.

Consideration was given to a revision of the Articles of Association and the By-Laws with a view to the creation of a new class of 'Group Members' to enable the electricity and gas boards to become members and to appoint individuals to represent them. Other alterations involved some alteration in age limits for certain classes and increases in certain subscriptions.

Councillor **A. Macfarlane** (Chairman of the Llandudno Urban District Council) gave the Association an official welcome and Mr. A. S. Tapsfield, the new President, was inducted into the Chair. He suggested that as this was the Silver Jubilee of the Association, it should be marked by offering honorary membership to three founders, Mr. C. S. Shapley (Leeds) who was President in 1925-26; Mr. R. Davidson (Newcastle) who was President in 1926-27, and Mr. Thomas Wilkie (Leicester) who was President in 1930-31 and again in 1947-48. The announcement was received with satisfaction by the meeting.

In the evening, there was a civic reception by the Chairman of the Urban District Council.

NINTH LIST OF GAS COMPENSATION VALUES

THE ninth list of compensation values of gas stocks, issued by the Ministry of Fuel and Power on Sept. 19, covers 160 securities of 67 companies. Pending settlement of the provisional interest payable on securities remaining unvalued at Nov. 1 next, the order converting these stocks into 3% British Gas stock will not be issued until after Oct. 31. Conversion normally takes place automatically when values are published, and the delay has been introduced to allow the Gas Council time in which to decide some method of approximate capital valuation of outstanding company issues in order to calculate interest and to make arrangements for payment. Gas stock was quoted last Friday at 90¼. In the following list stocks are shown in units of £100, unless otherwise indicated.

Company	Compensation Value
Ackworth, Featherstone, Purston & Sharlston 4% (Tax Free) Irred. Deb.	£140
Do. 6% Red. Pref.	£110
Do. Orig. 'A' (£10 unit)	£24/10/–
Do. Addl. 'B' (£10 unit)	£18/10/–
Aldeburgh 5% Cum. Pref. (£10 unit)	£11/4/–
Alston Pref. (£5 unit)	£3
Do. Ord. (£1 unit)	10/–
Amble & Warkworth Ord. (£5 unit)	£2
Associated Utilities 3½% Red. Deb.	£100
Do. 4% Cum. Pref. (£1 unit)	20/–
Do. Ord. (£1 unit)	21/–
Beith Ord. (£10 unit)	£16/13/4
Blyth Gas Co. 4½% Red. Deb.	£105
Do. Consol. Ord.	£140
Do. New Ord.	£140
Brackley 4½% Pref. (£5 unit)	£5/5/–
Do. Ord. (£5 unit)	£6/10/–
Bradford-on-Avon Orig. Ord.	£210
Braintree & Bocking Addl. Ord. (£10 unit)	£13
Broadbottom 5% Non-Cum. Pref. (£1 unit)	22/–
Do. Ord. (£1 unit)	37/6
Brotton Ord. (£5 unit)	18/–
Do. Ord. (£5 unit, £2 paid)	4/–
Cannock 4½% Red. Cum. Pref. (£1 unit)	21/5
Castleford & Whitwood 3¾% Red. Deb.	£100/10/–
Do. Orig.	£285
Do. Addl.	£225
Cleveland Ord. (£10 unit, £8 paid)	£4
Corbridge Ord. 'A'	£105
Do. Ord. 'B'	£105
Do. Addl.	£105
Crediton 6% Perp. Deb.	£135
Do. 5% Orig. Pref. (£10 unit)	£11
Do. 5% Addl. Pref. (£10 unit)	£11
Do. Orig. Ord. (£10 unit)	£4
Do. Addl. Ord. (£10 unit)	£2/16/–
Cromer 4% Deb.	£101/10/–
Do. Ord.	£140
Dudley Brierley Hill 4% Red. Deb., 1956	£102/10/–
Earls Colne 4% Red. Deb.	£100
Do. Ord. (£5 unit)	£5
East Wight 4% Deb.	£102
Do. 4% Red. Deb.	£100/10/–
Do. 5% Pref. †	£112
Do. Ord.†	£150
Exmouth 5% Deb.	£124
Do. 4% Deb.	£101
Do. Ord.	£150
Fauldhouse Ord. (£1 unit)	33/4
Galston Ord. (£1 unit)	40/–
Do. Defd. (10s. unit)	1/–
Girvan Ord. (£1 unit)	40/–
Gorleston and Southtown Ord. (£10 unit)	£20
Do. New Ord. (£10 unit)	£14/4/–
Gowerton Ord. (£5 unit)	£11
Halstead 6% Pref. (£10 unit)	£13/6/–
Do. 'A' Ord. (£10 unit)	£11/10/–
Haltwhistle Ord. (£5 unit)	£6/10/–
Haslingden 'A' (£10 unit)	£12/10/–
Do. 'B' (£10 unit)	£12
Hemsworth, Grimethorpe Ord. (£1 unit)	41/–
Hessle 6% Perp. Deb.	£145
Do. 6% Pref.	£132
Do. Orig. Ord.	£205
Do. Addl. 8% Ord.	£167
Do. Addl. 7% Ord.	£147
Hexham 5% Pref. (£10 unit)	£11/4/–
Do. Ord.	£100
Hollingworth Ord. (£1 unit)	2/6
Do. Addl. Ord. (£1 unit)	2/6
Huntingdon and Godmanchester Ord. (£10 unit)	£19
Irvine Ord. (£1 unit)	60/–
Kilmacolm Ord. (£1 unit)	27/–
King's Lynn 4% Pref.	£101
Do. 'A' Cap.	£112/10/–
Kippax Ord. (£1 unit)	40/–
Knottingley 5% Pref. (£1 unit)	22/3
Do. Consol. (£1 unit)	40/–
Do. Ord.	£150
Leiston 5% Mort. Deb.	£100
Do. 7% 'B' Pref. (£1 unit)	28/–
Do. Ord. (£1 unit)	20/–
Leyland 3½% Red. Deb.	£100/10/–
Do. 5% Pref.	£112
Do. 4½% Red. Pref.	£104
Maldon 5% Cum. Pref. (£1 unit)	22/5
Do. Ord. (£1 unit)	14/–
Muirkirk Ord. (£1 unit)	40/–
Mundesley and Holt 7½% Cum. Pref. (£1 unit)	30/–
Northampton 4% Deb.	£102/10/–
Do. 5% Red. Deb.	£105
Do. 3½% Red. Deb.	£100
Do. Consol.	£112
North Cheshire 4½% Red. Deb.	£104/5/–
Do. 3½% Red. Deb.	£100/10/–
Do. 5% Red. Pref.	£105/15/–
Do. 4½% Red. Pref.	£104/15/–
Do. 4% Red. Pref.	£101
Do. Consol. Ord.	£120
Ormskirk 5% Red. Pref.	£105/10/–
Do. 4½% Red. Pref. (£10 unit)	£10/8/–
Do. Ord. 'A' (£10 unit)	£20/10/–
Do. Ord. 'B' (£10 unit)	£14/10/–
Oxford 5% Deb.	£127
Do. 4% Deb.	£102/10/–
Do. 4% Red. Deb.	£101/5/–
Do. 5% Pref.	£113
Do. 4½% Pref.	£107
Do. 6% Red. Pref.	£104
Do. Consol. Ord.	£222
Do. Addl. Consol. Ord.	£222
Plymouth and Stonehouse 5% Perp. Deb.	£127/10/–
Do. 4% Perp. Deb.	£103
Do. 3½% Perp. Deb.	£98/15/–
Do. 3% Perp. Deb.	£90
Do. 7½% Stand. Addl. (£10 unit)†	£25/14/–
Do. 7% Stand. New (£10 unit)†	£24/15/–
Do. 5% Stand. Ord.‡	£162/10/–
Redditch 4% Red. Pref.	£100/8/11*
Rothwell Orig. (£10 unit)	£21
Do. Addl. (£10 unit)	£15
Ryde 4% Deb.	£102
Do. Ord.†	£150
St. Ives (Hunts) 4½% Red. Deb.	£100/10/–
Do. 7% Pref. (£10 unit)	£15
Do. 6% Pref. (£10 unit)	£13/4/–
Do. 5% Pref. (£10 unit)	£11/4/–
Do. Orig. Ord. (£10 unit)	£9
Do. Addl. Ord. (£10 unit)	£6/10/–
Settle 4% Pref. (£5 unit)	£5/2/–
Do. Orig. Ord. (£5 unit)	£10/5/–
Do. Addl. Ord. (£5 unit)	£7/5/–
Sheringham 5% Deb. (Gas)	£125
Do. 5% Deb. (Water)	£130
Do. 6% Pref. (Gas)	£133
Do. 5% Pref. (Water)	£125
Do. Orig. Ord. (Gas)	£130
Do. Addl. Ord. (Gas)	£92
South Wales Gas Corporation 4½% Pref. (£1 unit)	21/8
Do. 5% Prefd. Ord. (£1 unit)	13/–
Do. Defd. Ord. (5s. unit)	1/–
Spennymoor and Tudhoe Orig. (£10 unit)	£20/2/–
Do. Addl. (£10 unit)	£14/2/–
Stowmarket 4% Red. Deb.	£100/10/–
Do. 5½% Pref. (£1 unit)	24/6
Do. 5% Pref. (£1 unit)	22/3
Do. Ord. (£1 unit)	20/–
Thame Orig. Ord. (£1 unit)	36/–
Do. New Ord. (£1 unit)	28/–
Vale of Leven Ord. (£1 unit)	48/–
Wadebridge Ord. (£1 unit)	89/–
West Calder Ord. (£1 unit)	10/–
Westgate and Birchington Ord. (£10 unit)	£15
Whitehaven Ord. (£1 unit)	19/9
Witham Ord. (£10 unit)	£10
Do. Ord. (£5 unit)	£5
Do. Ord. (£2 unit)	£2
Do. Ord. (£1 unit)	£1
Woodstock Power Syndicate 4% Red. Deb.	£100
Do. Ord. (£1 unit)	58/–

* The value of these securities has been determined by reference to the prices of issue, in accordance with Subsections 25 (6) and 25 (7) of the Act. The average value (Section 25 (7) (*b*)) is shown, and is applicable except where a price of issue (Section 25 (7) (*a*)) determines the compensation value.

† The value of these unquoted securities has been determined in accordance with Sections 25 (10) and 26 (4) of the Act.

‡ The value of these quoted securities is the value for the purposes of Section 25 (2) of the Act as increased by direction of the Minister in accordance with Section 26 (1) of the Act.

Interest Payments

Payment of six months' interest on the British Gas Stock issuable in lieu of some 800 classes of securities which have been valued will be made on Nov. 1 to holders on the registers at the close of business on Sept. 26. In regard to securities which have not been valued or have not yet been covered by a Statutory Order, the Minister has issued a Direction that the Gas Council shall on Nov. 1, make payments of interest to the registered holders at the close of business on Sept. 26. Exceptions to this general arrangement are securities bearing an inscribed rate on which no interest or dividend was paid in the years 1944 to 1947 and other securities on which no dividends or dividends averaging less than 1½% per annum were paid in those years. No provisional interest will be paid on Nov. 1 in these cases.

Interest will relate to six months to Oct. 31, and will be paid at such rate on the nominal value of the old securities as is estimated to produce, in the opinion of the Gas Council, a payment not exceeding the amount of interest on the British Gas Stock ultimately issued as compensation.

In the case of securities, the values of which are agreed between the Minister and Stockholders' Representatives and announced by the Minister before Nov. 1, but which are not covered by a Statutory Order until after that date, the Gas Council will arrange that as far as practicable the interest payment on Nov. 1, will be the amount due on the British Gas Stock to be issued in due course.

Where securities are valued and are included in a Statutory Order made during the six months commencing on Nov. 1, interest on the British Gas Stock issued by way of compensation will be paid as from that date in the normal way, but if any amount is due by way of interest for the preceding six months the Gas Council intends to ask the Minister to issue a further Direction enabling them to make good the deficiency at once to holders on the registers at the close of business on Sept. 26.

The Autumn Meeting of the Sagem Golfing Society will be held at Sunningdale on Oct. 26 (the day after the general meeting of the Southern Association of Gas Engineers and Managers). Members who have not received notice or members or prospective members of the Southern Association who desire to join should communicate with the Hon. Secretary, Mr. L. Trewby, St. Petrocks, 65, Nightingale Road, Rickmansworth, Herts (Telephone: Rickmansworth 3389).

ORGANISATION AND CONTROL IN GROUP WORKING

By ALEXANDER McDONALD, B.Sc., A.R.T.C., A.R.I.C.,
Member, North Eastern Gas Board

***EDITOR'S NOTE*:—The experience of methods of integration gained by Mr. McDonald during his association with the York-Harrogate Group is embodied in this paper, which has a particular significance in view of the author's appointment to the North Eastern Gas Board as a full-time member. The author gives a picture of how the undertakings in the group, while retaining their legal identity, co-operated in the formation of one co-ordinated whole. Although the facts provided are applicable only to conditions before vesting day, the lessons to be learnt are of the greatest value in the present formative period.**

THE investigator who probes into the mysteries of integrating gas undertakings finds a peculiar fascination which grips him more firmly as he delves further into its depths. Formerly his efforts were circumscribed in so far as no single organiation had sufficient authority to plan over a wide area.

Today the circumstances are entirely altered. The Gas Act has now placed the responsibility for planning and efficient operation directly into the hands of the various area boards and this fact has removed many of the obstacles which faced advocates of some form of rationalisation. It would appear, therefore, that there is greater scope for the application of this subject than every before in the history of the industry.

Types of Integration

What then are the possibilities? They can be divided into four main categories :—

(1) Physical linkage with manufacture at centralised stations.

(2) Physical linkage with manufacture at the pit head.

(3) Joint management without physical linkage.

(4) A combination of any or all of the foregoing.

From my experience it is folly to rush blindly into any of these forms of integration without fully investigating all the possibilities and all the aspects. It is so easy to look at a large number of small units and to plan expensive schemes which can never be an economic proposition.

Perhaps, therefore, it would be of interest to some of you if I gave you an outline of my experiences in this class of work.

I must make it perfectly clear, however, that any details which I submit applied before Vesting Day and were not designed to apply to a nationalised industry.

General Considerations

Let me say at the outset that extensive schemes of integration are not necessarily the cure for all the evils to which we are heir, and detailed investigations are essential before any decision is arrived at.

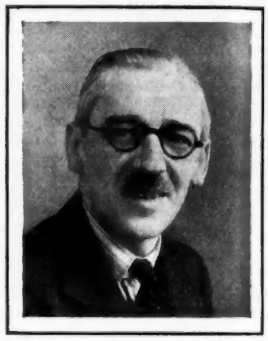
It does not matter very much which of the possibilities are under consideration, and I believe that in the future all of them will be adopted in one area or another, there are three fundamental principles which alone can justify their adoption :—

(*a*) Will the proposals reduce costs so that the consumers obtain the benefit of the cheapest possible supply?

(*b*) Will the proposals improve facilities so that the consumers receive a more satisfactory service.

(*c*) Will the smallest units obtain the services of the specialists which only the largest units can afford to carry?

I have found that in preparing proposals it may well be that a particular scheme is not an immediate economic possibility but that by adopting a long-term programme combined with a bold policy of development it is possible to reach a point when it does become an economic proposition because the oncosts and capital charges are spread over a much larger load.



Mr. McDonald was educated at Allan Glens School and the Royal Technical College, Glasgow, and Glasgow University. Joining the Motherwell and Wishaw undertaking in 1924, he became Engineer and Manager in 1931. He was later Engineer, General Manager, and Secretary of the Castleford Group in 1938, General Manager of the West Riding Group in 1944, and Director and General Manager of the York, Harrogate Group in 1944.

Although the title of this paper does not include a study of this aspect, the mention of capital requirements induces some reference to it, particularly in the case of physical linkage. When it is remembered that costs of plant and distribution have increased two to three times since 1938 many engineers must hesitate to face capital expenditure which will involve them in anything from 3d. to 4d. per therm additional charges.

I would point out, however, that this cost is not peculiar to integration but must apply wherever the demand for gas necessitates additional plant. It seems unlikely that the cost of new plant or mains will be greatly reduced in the near future and I would suggest that, as there is every possibility that costs in some form must be incurred, then we must set out to develop the consumption per consumer and so mitigate to some extent this increased cost. Integration in one or other of its forms may, if wisely applied, actually mitigate such a charge. Thus, where the capital costs rule out any form of physical linkage, the adoption of joint management may afford material benefits.

In some areas the decision is much easier than in others, due to the high density of population affording a greater return on capital, but I would suggest that the greatest single factor is in estimating the probable future demand and making adequate provision to meet it. In this respect every area becomes an economic and geographical problem which must be individually investigated before a final scheme is adopted. The results of that investigation in a particular area might quite possibly be that integration is not the answer to the problem. If so the proposals should be discarded.

In this case two or more works are linked together by the necessary mains and manufacture is centralised at a single works. The time for such a scheme must be suitably chosen to obtain favourable conditions. Thus, if capital expenditure and renewals are required at a majority of the works much of this can be diverted to the proposed scheme. Such a proposal may involve the adoption of a short-term programme involving the cessation of expenditure at certain works to fit in with the long-term programme of centralisation. In order to do this it is necessary to estimate the expenditure required to put each works on a firm foundation and then to prepare estimated revenue accounts for the immediate future and for the more distant future. Similar capital estimates to effect centralised manufacture and link the various works, together with revenue accounts to determine the estimated running costs, are then necessary. A comparison of these estimates will indicate whether the proposals will be of any financial advantage to the consumer. Then only is it possible to come to a decision as to the advisability of such a physical link.

In one case in my experience it was found that the capital cost of centralised manufacture was considerably in excess of that necessary to retain individual units. On the other hand the estimated revenue accounts showed that the saving in manufacture more than covered the annual charges on capital and left a balance to provide a reduction in price to the consumers.

The scheme was therefore adopted, plant and equipment were installed at the centralised works, and a high pressure main was laid to feed the works which was to be closed down. This latter works then became only a holder station, the surplus plant being dismantled and sold. A standardised policy was adopted throughout the area and the general service to the consumer much improved.

In the 10 years prior to the war this undertaking increased its output by 22.5%, while due to the centralisation scheme and the development work carried out the average price received for gas was reduced from 12.14d. per therm to 8.52d. per therm.

I have given these figures are being the salient features which fulfil the principles already indicated.

Physical Linkage with Pithead Carbonisation

With pithead carbonisation the appropriate works are linked together by high pressure main and supplied with gas from the coke ovens. Carbonisation ceases at all the works or may be retained at specified stations to meet existing or contemplated circumstances. All the works may be brought under joint management.

This type of integration can only be adopted in certain areas where adequate supplies of coal are available over a long period. Investigations and negotiations are, therefore, necessary to determine the quantity of gas which can be supplied and the cost of that gas to the gas undertakings.

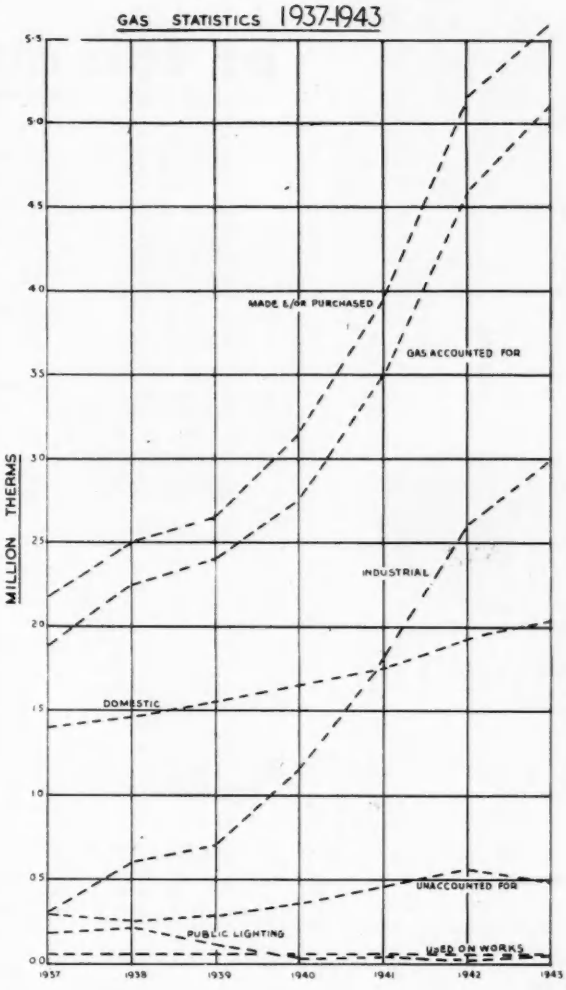
It must be evident that here again capital requirements and revenue accounts must be carefully prepared and compared with the revenue accounts of the various units if they were brought to satisfactory condition. Similarly, it will be apparent that the choice of time can materially affect the decision.

I have had experience of this type of integration where a group of eight separate undertakings were under consideration. When the preliminary investigations had been completed it became apparent that the proposals would be an economic proposition to the companies and a benefit to the consumers. It was therefore decided to proceed with this proposal, but in addition it was agreed to adopt also the principle of joint management which will be described under the next heading.

The necessary contracts for coke oven gas were entered into and some 70 miles of grid main were laid linking the undertakings whose works were closed down. It should be mentioned in this case that an intermediary company came into

GRAPH No. 1.

GAS STATISTICS 1937-1943



being who purchased the gas from several coke ovens, and was responsible for the capital expenditure involved in the grid mains and for the supply of gas to the eight works in question.

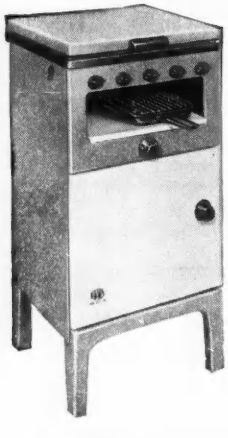
A standardised policy was adopted throughout the area and a vigorous development programme instituted in order to take up the available supply of gas. The results in this case were astounding and again show that the postulated principles had been fulfilled. Thus from a combined make of gas of 440 mill. cu.ft. per annum the gas bought increased to 1,115 mill. cu.ft. in six years. The average price received fell from 10.4d. per therm to 6.6d. per therm, while the capital expended on these undertakings (exclusive of grid) dropped from £784 to £353 per mill.

The salient results in this case are shown in graphs 1 and 2.

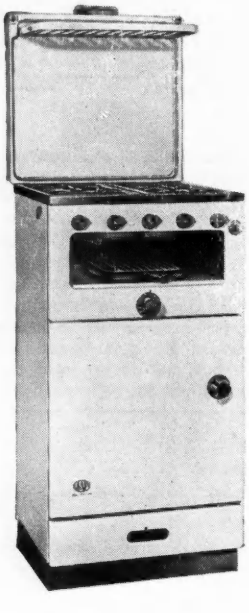
The scope of this paper does not strictly cover a discussion on coke oven gas supply. It is, however, a question of major importance, and I may be pardoned for making some reference to it.

First of all, the gas undertakings are directly responsible for the maintenance of supply and cannot pass on this responsibility to another industry. In my experience the coke oven supply tends to maintain only the base load, which leaves peak load conditions to be met by the undertaking itself. This has

choice is one of the main features

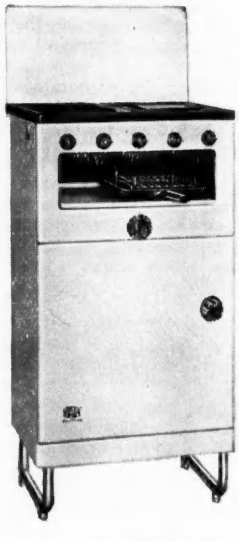


177 with hinged cover closed; 3 boiling burner hotplate; 14" oven; cast iron legs; dapple/white finish.



177 with hinged cover and shelf; 4 boiling burner hotplate; 16" oven; plinth base; cream/black finish.

177 with platerack and backplate; 4 boiling burner hotplate; 16" oven; cast iron legs; dapple/white finish.



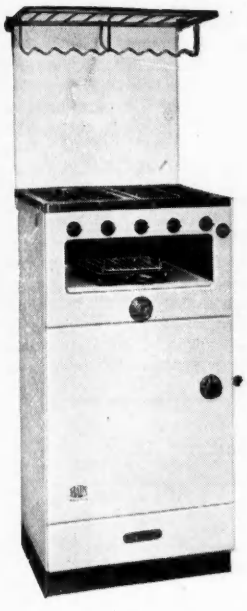
177 with short splash-plate; 3 boiling burner hotplate; 16" oven; tubular legs; cream finish.

MAIN

177

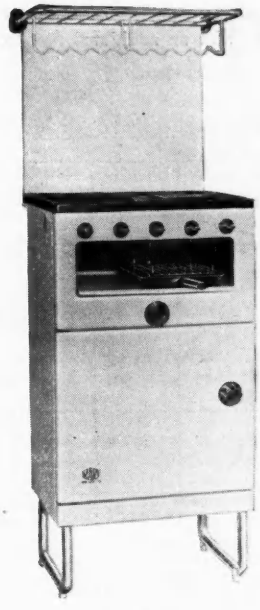
GAS COOKER

WITH A CHOICE OF INTERCHANGEABLE FEATURES



177 with platerack and backplate ; 4 boiling burner hotplate; 16″ oven; plinth base ; cream/black finish.

177 with short splashplate; 3 boiling burner hotplate ; 14″ oven ; plinth base ; dapple/white finish.



177 with platerack and backplate ; 3 boiling burner hotplate; 14″ oven; tubular legs ; cream finish.

177 with short splashplate ; 3 boiling burner hotplate ; 16″ oven ; cast iron legs ; dapple/white finish.

CHOICE OF 177 FEATURES

Platerack and backplate, or short splashplate.

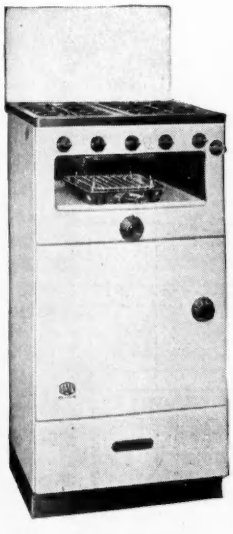
Hinged cover with shelf.

Oven heights: 14″ or 16″. (Portal, 14″ only)

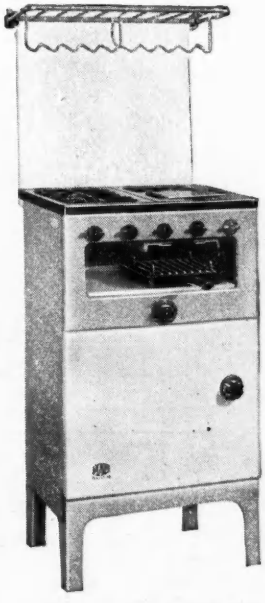
Hotplates with 3 or 4 boiling burners.

Cast iron legs; plinth base or tubular legs.

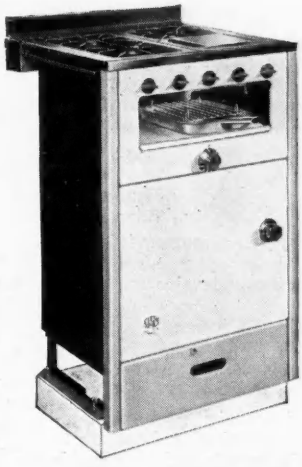
The finishes are: dapple and white, or cream and black.



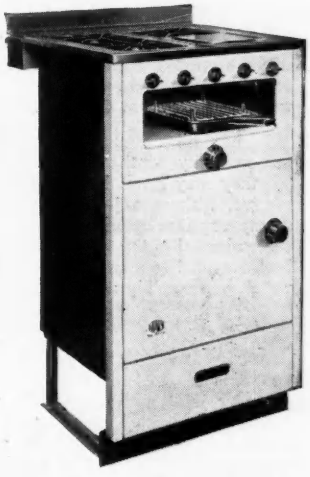
177 with short splashplate ; 4 boiling burner hotplate; 14″ oven; plinth base ; cream/black finish.



177 with platerack and backplate; 3 boiling burner hotplate ; 14″ oven ; cast iron legs ; dapple/white finish.



177 Portal type with cream/green finish. (Supplied only with 3 boiling burner hotplate and 14″ oven).



177 Build-in type with 14″ oven; plinth base; cream/black finish. (Supplied only with 3 boiling burner hotplate).

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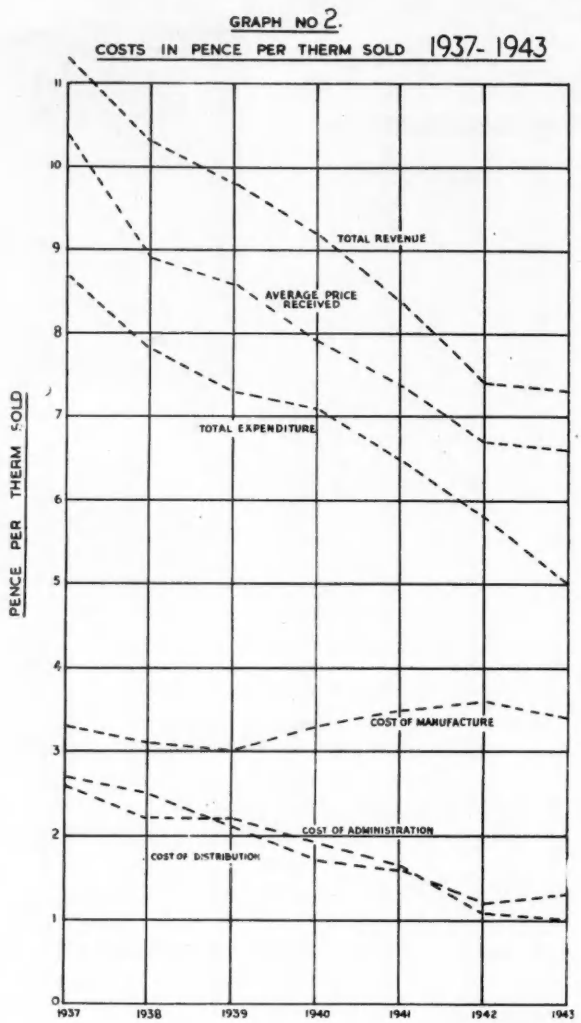
happened where we were forced to put plant to work or *vice versa* to meet variations in demand with an additional cost to



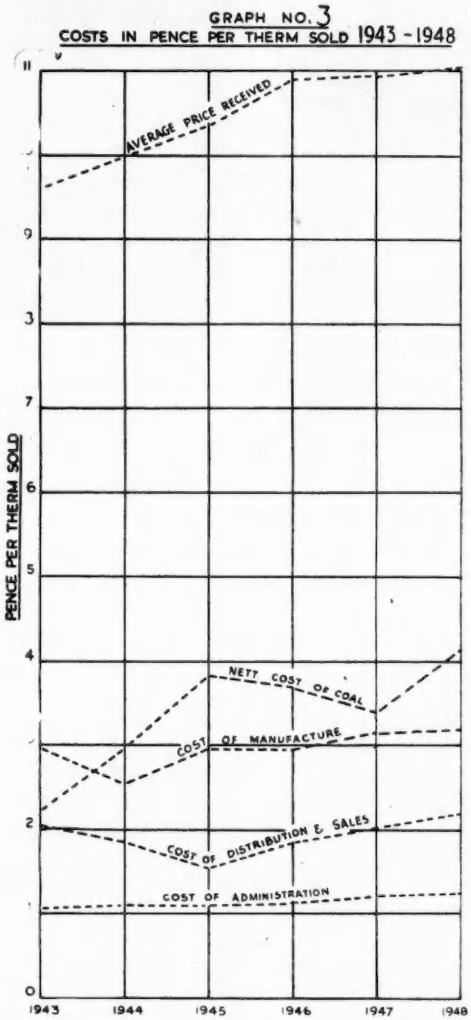
the undertaking. Such a condition of affairs raises the issue of who should control the supply and whether greater flexibility would not be possible if the complete control were in the hands of those directly responsible to the consumers.

In a similar manner the undertakings cannot shirk their responsibility for the calorific value and quality of the gas and yet they may be entirely dependent on the supply which they receive, without any direct control. Here again the issue of the appropriate calorific value to supply to consumers is largely determined by the coke ovens and in my experience may involve too big a margin from the declared value and sometimes even too big a variation.

Joint Management

Under joint management the various units are brought together with unified control and the organisation is set up to direct the whole as if it were a single undertaking. By this means the employment of specialists to cover the whole area becomes possible, overlapping is avoided, 'pools' of employees can be adopted so that the individual units do not require to carry employees to meet emergencies, centralised stores can be instituted which reduces idle capital, and group services brought into being to serve each unit.

In one group which came under my control it was decided, after the preliminary investigations had been carried out, that this was not a case for physical integration with capital costs at their present level. Six undertakings varying in size from 1,232 mill. cu.ft. per annum down to 12 mill. cu.ft. per annum, covering an area of 600 sq. miles and serving some 70,000 consumers, were brought under joint management. The problem, therefore, became largely administrative in order to obtain the maximum benefits. Towards this end the necessary organisation was brought into being, the various functions and activities were investigated, and the necessary development work



was instituted. Some of the details of this work will be described under a later heading.

The result was that in six years the make of gas increased from 2,413 mill. cu.ft. to 3,325 mill. cu.ft. The consumption per mile of main increased from 3,875,000 cu.ft. to 5,067,000 cu.ft., although over 40 miles of main had been laid; and the consumption per consumer increased from 29,938 cu.ft. to 41,119 cu.ft. per annum.

As this work was carried out from 1943 it could not be expected that the price of gas would fall, but the average price received increased by only 15 per cent.—namely, from 9.61d. per therm to 11.03d. per therm, though, at the same

time, the cost of coal increased from 34s. 7d. per ton to 55s. 10d. per ton, equivalent to 61%.

The principal costs are set out in graph No. 3.

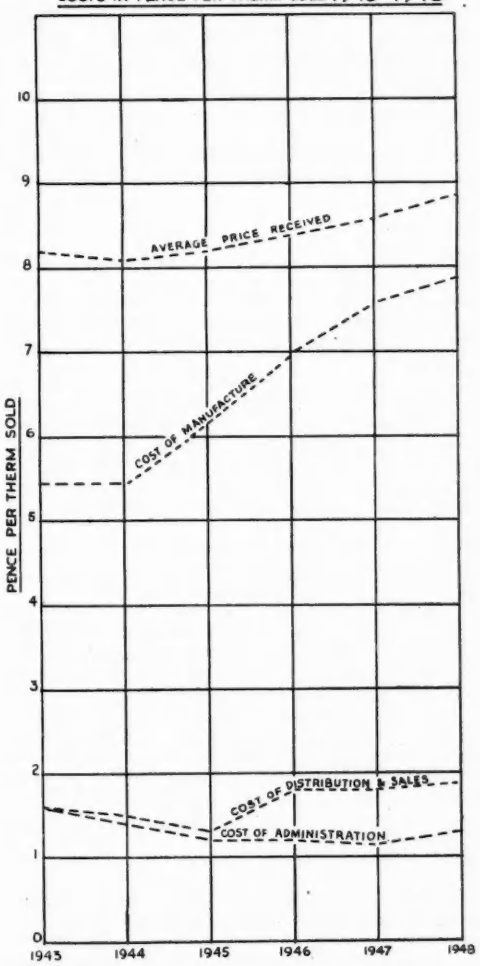
Combination of Methods

It must be evident that any combination of the foregoing can be arranged to suit the circumstances where it is inadvisable to adopt any one of them individually. This happened in still another group consisting of 15 companies, with a total of 21 stations, which in 1943 had an output of 2,506 mill. cu.ft., the largest unit of which at that time was 462 mill. cu.ft. In this case there were seven manufacturing stations of which four were not connected to the grid while 14 stations took all their gas from the grid.

Since the formation of this group alterations have taken place with a view to reducing ultimately the number of manufacturing stations while a further works had to be brought into operation in order to meet the demand for gas. The availability of further supplies of coke oven gas will in due course close down this work again. It seems evident that in this case also joint management is an added advantage. We had, therefore, the somewhat complicated position where all the possibilities were in being. In six years the output in this group increased from 2,506 mill. cu.ft. to 3,700 mill cu.ft., equivalent to 36.7%. Although 49 miles of main were laid during this period, the consumption per mile of main increased from 4,015,900 cu.ft. to 5,258,900 cu.ft., and the consumption per consumer increased from 24,568 cu.ft. per annum to 33,347 cu.ft.

GRAPH NO. 4.

COSTS IN PENCE PER THERM SOLD 1943-1948



This work again took place in the immediate post-war period with increasing costs of coke oven gas due to the increasing price of coal and increasing wages, &c., but even so the average price received for gas increased from 8.02d. per therm to only 8.82d. per therm.

The results are again illustrated graphically in graph No. 4.

Organisation and Administration

In all types of rationalisation some organisation is necessary, but in my experience the organisation must be varied to suit the circumstances of the particular type of integration which is adopted. It is therefore difficult to give any scheme which can be applied in all cases. Nevertheless, it may be of interest to give you an outline of the general principles which we adopted. Basically these consisted in making all the undertakings in a group work as one co-ordinated whole and avoiding all tendency to run as a number of individual units, although each company still retained its legal identity, producing its own minutes and its own balance sheet. This is one aspect of grouping which is simplified by nationalisation, although it must be admitted that these statistics have some advantages.

Towards this end the directors of each company met as a Joint Board so that a common policy was adopted throughout the area. They agreed that each official wherever he was situated should carry the maximum amount of responsibility, and he was thus required to use his own initiative to increase the efficiency of his department.

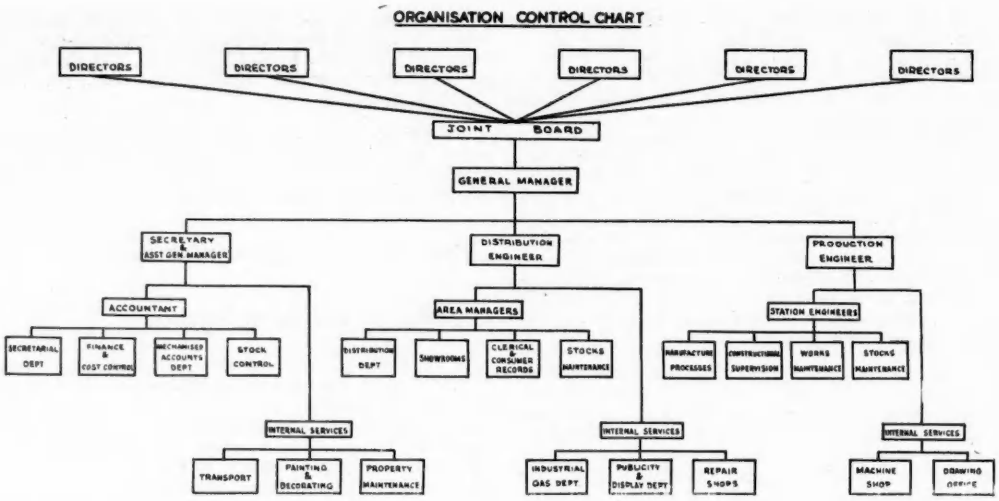
For this reason only four Group officials were appointed, with the necessary staff, whose aim was to correlate the activities within the group and to support and reinforce the local officials. These group officials were, therefore, non-operational, working out the details of policy, placing facilities at the disposal of the local officials, and preparing schemes of development.

The whole of the district was then divided into areas over which area managers were appointed, their duties were mainly administrative, putting into effect the policy laid down and being relieved of all responsibility for manufacture. They carried out the sales policy, maintained local publicity, were the contacts with councils, organisations, and consumers, and dealt with distribution or supply questions.

At each manufacturing station an engineer was appointed who carried the full responsibility for all technical results on the works and for the condition of plant, buildings, &c. They were the real operational officials who were relieved of the detail work of organisation which can be so irritating to the engineer. In the case of holder stations which were supplied from the grid or from a centralised works a superintendent was appointed who was responsible for the condition of his works and controlled the intake of gas.

The attached chart shows how this organisation worked—the details of group services shown thereon will be discussed later.

On the administrative side the control was centred on head office, the district offices carrying only sufficient staff to maintain a satisfactory local consumer service. Thus all correspondence except purely local consumer correspondence was dealt with at head office if necessary after consultation with the local officials. All material was ordered centrally on requisition from local units, invoices were similarly received, checked, and paid, which involved a reduction in the total number of orders and consequently in the number of cheques. All accountancy and secretarial work was similarly carried on from head office. The routine daily work, both distribution



and clerical, was dealt with from the offices of the area managers where detailed consumer records were kept, while the purely local offices handled only residuals—where applicable—distribution job sheets and receipt of payments.

The establishment at any unit was fixed at that necessary to meet the day-to-day requirements and the formation of a pool of mobile employees assured that assistance could readily be given for any special job. The total establishment of the group was thereby reduced.

Group Activities

Reference has already been made to group activities, and we found that they were a fruitful source of economies in co-ordinating the activities common to all units. A short description of some of these will perhaps help towards a realisation of their usefulness.

First of all centralised stores were set up varying in number to suit the size and requirements of the area. This reduced the total amount of capital tied up in carrying excessive spares and stores at each unit since they could draw on the centralised stores by requisition. All stock records were co-ordinated at head office with the result that the availability of any particular requirement was easily ascertained and the work of local officials consequently reduced. By co-ordination of transport it was possible to ensure that each vehicle was fully utilised and fewer vehicles were then required, while outside contracting was minimised. With a properly equipped centralised repair shop regular routine maintenance of all vehicles was carried out.

By properly programming the work the painting squad was kept fully occupied both summer and winter even where a group consisted of a number fo small or medium units. This procedure avoided the employment of periodic additional labour and ensured the satisfactory standard of work.

A fully equipped mechanics workshop with ancillary blacksmiths and joiners shops, although normal in large undertakings, was developed to carry out new or repair work for the smaller stations, thus spreading the overheads, reducing costs, and giving a much quicker service. The same applied to appliance repair shops, which enabled us to carry out work for consumers to meet their requirements.

The industrial department was of special value to the small and medium sized works who were not generally in a position to give this specialised service to industrialists. As an instance of the value of this service I might mention the case of one small undertaking which in 1938 had an output of only 30 mill. cu.ft. Today the output has grown to no less than 298 mill. cu.ft., due to the efforts of specialists which this company could not have employed.

On publicity the same thing applied. Thus on demonstrations home service and film displays the department was sufficiently flexible to cover the whole area and went directly to many small and outlying areas formerly neglected. In 1945 only 10 demonstrations were given with a total attendance of 337, but by 1948 these had been increased to 224 with an attendance of 12,866. Home service calls during the same period increased from nil to 1,648.

These examples of group activities, which could be further extended, should be sufficient to indicate how duplication was avoided, how specialists and craftsmen became easily available to small undertakings and how a more intimate contact with consumers was attained.

Control

In any scheme of integration it is necessary to have some form of control once the appropriate organisation has been brought into being. For this purpose reports are necessary if the executive officials are to be kept informed as to the progress of each department or unit. In our group these reports were designed to come in daily and monthly, with an annual report compiled at head office from the figures thus obtained. These reports were kept under constant review to ensure that no unnecessary work was entailed in their compilation. Where it was necessary to institute reports for special purposes these were discarded as soon as they had fulfilled their requirement.

Daily Report

This report was in simple form, the information for which could be 'phoned in each morning from the various stations. This gave the quantity of gas made and/or purchased, the output of gas, the stock of gas, and at difficult periods the number of days supply of coal. Additional information could be added to meet special circumstances. The output figures were graphed daily against the previous year's figures so that the positions of any unit could be seen at a glance. The graphs were annotated to show the corresponding temperatures and special details such as dates of holidays, &c.

Monthly Reports

Manufacture.—Each month a manufacturing return was submitted by each unit. These were correlated on to a single sheet for easy comparison and totalling to Group figures. First we had a statement of the gas made and/or purchased with a column showing the percentage increase or decrease for the month, followed by a running total for the year to date again showing the percentage increase or decrease. Next came a

statement of the actual carbonising results and finally stocks of coal, coke, &c., on hand.

Distribution.—A similar return was prepared for this department giving the meters fixed and disconnected under their various classes, followed by the yardage of the various sizes of mains laid or relaid and the number of new and relaid services. Appropriate totals were shown under each heading for the whole group.

With the shortage of men and materials we found it necessary to institute a 'jobs outstanding' return. The various types of fitting or complaints jobs were classified and each unit gave—as well as the number completed each month—the actual number outstanding with the reason for the delay, if any. This gave a close check on the progress of the work and enabled group officials to assist any one unit by the transfer of men or materials where necessary.

Sales

Under this heading again a return was prepared and summarised for the group showing the number of the various types of appliances fixed as well as the net increase or decrease on the district. The cash value of these appliances was also stated and comparative figures for the previous year indicated the tendency in market conditions and enabled weaknesses to be picked out and dealt with. As the industrial department was considered to be of major importance, a report was prepared giving the installations completed in each area, together with the hourly and annual loading and the industrial scale of prices applicable. This was of particular value to station engineers and distribution engineers as they had previous knowledge of these loads coming forward, the enquiries on hand and the progress each month being included in the report.

Financial

A cost of manufacture return was prepared giving for each unit the monthly costs and the costs for the year to date. From this the gross cost of coal, the return from residuals, the net cost of coal, and the various items making up manufacture were apparent. Space was left for explanatory remarks on any items of extraordinary expenditure.

This particular return gave a yardstick when placed against the Budget estimates for each unit and a useful means of comparison.

Annual Report

The compilation of the annual report involved a good deal of work especially as details of all group activities were included. We considered that this work which was carried out at head office was exceptionally valuable in that the exact position of any phase of activity was immediately available for reference. Further from this information chief officials were in a position to plan for the future. While monthly reports are of value in checking current trends, the longer period involved in an annual report gives more reliable data for future planning.

Discussion on Reports

The preparation of these reports is so much wasted time and paper unless they are actually used. It is not sufficient to submit them to a board of directors. Every official throughout the area should receive a copy which includes not only his own district, but every other district in the group, and this enables him to make his own comparisons. We went even further than this and held regular conferences of all officials when these reports were very fully discussed. Explanations of results—good as well as bad—were offered by each official and suggestions made for improvement.

The policy of the directors was carefully explained to all officials at these regular meetings. Officials were encouraged to take an interest not only in their own particular sphere, but in every branch of the group, thus fostering a team spirit and a realisation that their activities were a very large factor in the final results of the group. They were induced to submerge their loyalties in their own department in that of their unit and finally in the wider loyalty of that of the group as a whole.

Conclusion

In conclusion I would emphasise that it is the easiest thing in the world to over-organise with the consequent result of too many officials and employees whose time is spent making out reports or preparing statistics. If the organisation becomes too elaborate and the creation of too many officials is necessary, then many of the benefits of grouping can be lost.

In my experience it is best to hold the man on the job fully responsible for his results, leaving the chief officials free from all detail work and able to carry out their true function of policy formation and future planning.

One final word. Much of the success of any group is the result of teamwork. Apart altogether from the competency and experience of the principal officials—which, of course, are first essentials—these officers must appreciate what grouping means.

Many people have only a very hazy idea of this. An efficiently working group cannot be brought into being overnight. It is, in fact, a process of gradual development which may be spread over several years. It consists essentially of welding together a number of heterogeneous units into one complete whole. If you prefer it better, it is the gradual building up of a very complex mosaic, which time alone can achieve.

DISCUSSION

Mr. **E. G. Smith, Glasgow,** remarked that to many of them the opportunity to explore integration and grouping had been denied by the lack of the necessary details in neighbouring undertakings, and planning was always subject to qualification, for no detailed examination could be carried out. The setting-up of area boards had brought integration and grouping to the forefront, and it would fall not to a few, but to all, to co-operate with the area boards in the presentation of future development schemes.

The paper amply illustrated and rightly emphasised the need to approach each scheme with an open mind. No business could stand still; it must go forward or backward, and at the present time 'go forward' meant high capital per unit of additional plant as compared with 1939. To counteract this exceptionally heavy burden an active and bold sales policy was necessary, the objective to be an increase in the gas sold through the existing capital plant. Integration in any of its forms must run hand-in-hand with increased consumption per consumer if real success was to be achieved.

The greatest single factor in planning development is, as Mr. Andrew stated, estimating future requirements. Not the least difficult was the industrial field where gas undertakings obtained loads not always on sales effort or cost of gas relative to alternative fuels but in many instances by the withdrawal or reduction in quality and quantity of competitive fuels coupled with attendant labour difficulties. At that time, while yielding immediate advantages, it was not always to the ultimate advantage of the undertaking to accept the additional load, but it was a national duty to employ surplus capital plant to the fullest extent. The time had come when additional capital plant was required, and where exceptionally low charges operate for industrial gas these must be reviewed. Recasting of industrial tariffs might result in loss of consumption on the low return per 1,000 cu. ft., but this would not altogether be a disadvantage. There was in Scotland a wide field in commercial and industrial uses only partly developed, and the substitution of borderline consumers by a more reliable and continuing demand would permit greater accuracy in estimating future requirements and remove the attendant risk

of embarking on additional capital expenditure for future developments where the existing load was in part false and not always economic.

Sharing Responsibility

His short experience of coke oven gas had convinced him that it was wrong to compare normal gasworks production with undertakings accepting coke oven gas as part of their output. In Glasgow coke oven supplies were on base load for weekdays with increasing deliveries at weekends. In winter, the weekday output included 19% coke oven gas and at weekends 24%. In summer, the weekday output included 30% coke oven gas and at the weekend 43%. The ratio of maximum to minimum week over the year was 1.581 to 1 on gas sales, but the ratio of gas produced at the town gas manufacturing stations was 1.99 to 1 for minimum to maximum week. The effect on production stations was, in some measure, to make them complementary to the coke oven supplies, and there was an increasing difficulty in planning production when coke oven supplies were liable to vary while plant must always be available and ready for operation at all times to counteract any failure in coke oven supplies. It appeared that attempts to synchronise gas production at coke ovens to consumer demands resulted in an inferior coke, and this lack of flexibility of gas production at coke ovens was a disturbing factor in the control of normal gasworks production and production results.

From a national viewpoint it was desirable that all surplus gas be put to good use, and if coke oven supplies were to continue, then those responsible for its production must be brought to share in the responsibility for maintaining the supply and reduce the amount of stand-by plant at present necessary. The grouping of undertakings and pooling of resources would undoubtedly lead toward economies by greater use and application of marginal labour and plant, while immediate advantages could be obtained by making available to smaller undertakings the technical and sales knowledge of the larger units.

Mr. H. S. Milne, Aberdeen, said that examples of group working described by Mr. Macdonald were most striking and showed clearly the benefits which might result from intelligent and bold planning allied to experience and a meticulous regard for detail. While the methods described would all seem to fit into the picture in varying degree so far as the more heavily populated parts of Scotland were concerned, there remained the special case of the isolated undertakings. The gas industry had always made a proud boast of its service to the consumer, and there was to be a strong moral obligation to continue and improve the service given by even the smallest and most remote unit. Under a unified control it should be possible vastly to improve the lot of the isolated unit although the distance between units might limit somewhat the benefits to which Mr. McDonald referred. On the other hand they might benefit in an indirect way from the linking of undertakings in more populous areas as redundant plant from works which had been closed or altered could be put to good use.

Unfortunately very little thought appeared to have been given to the design and construction of foolproof plant for the very small works where it was essential to eliminate to the fullest all complicated operations.

Staff Recruitment

Many of them had been in the habit of handling much detail work and either from choice or necessity been unable to delegate responsibility to a sufficient extent. If, however, full advantage was to be taken of the co-ordination of undertakings under group working some measure of staff re-organisation would inevitably result, and they might be faced with a problem if a sufficient number of young men suitably qualified and capable of accepting responsibility was not forthcoming. The possibility of recruiting staff without previous gas engineering experience from local sources should not be overlooked.

The author had shown how the sale of gas had increased following the grouping of undertakings, and it would therefore appear to be necessary to build up an adequate gas fitting staff to meet the increased demand. In Scotland they tended to suffer from a shortage of properly qualified gas fitters, and it might be that the larger undertakings with adequate facilities would be able in the future to train apprentices for transfer later to surrounding undertakings.

Mr. W. Nicol Baird, Perth, said there was no question that the drift of events in all forms of organisation was towards a greater degree of specialised authority. There should, however, be no suggestion that any one manager ought to specialise in one particular subject all his working life. That would tend to produce men of narrow views and to restrict the field of recruitment for co-ordinating positions. His executive authority and responsibility should cover all the activities carried on under his sphere of control, though certain subjects might be reserved for higher specialised authority. Where this occurred the manager might tend to have very little concern with such subjects whatever the nominal impact of his responsibility. He was then much more likely to treat the subordinate personnel handling such matters within his sphere of control as specialists directly responsible to their specialised chief, with whom it was not his business to bother. If, however, managers, encouraged more than likely by the chief of the specialised activity, tended to wash their hands entirely of subordinate specialists working within their own department, then co-ordination was weakened. Alternatively managers might resent the suggestion that some subjects which they had previously handled themselves should be specialised, while thirdly there was also the difficulty which many subordinates found in obeying two masters, the man in charge of their subjectival speciality and the man immediately in charge of the unit in which they were for the moment working. These difficulties could to some extent be resolved by passing all incoming and outgoing correspondence through one channel only—namely, the manager's office.

Heavy Capitalisation

Heavy capitalisation would undoubtedly be necessary to put the gas industry into good shape; the overall amount of that expenditure would be controlled by the Minister in consultation with the Gas Council, having regard to the national economy. Their problem was how to expend the available capital to the best advantage, and how best they could meet the burden of capital expenditure. It was clear from Mr. McDonald's paper that what was required was a long-term programme combined with a bold policy of development in order to spread the overhead charges by very much increased consumption of gas, and this in turn called for a more highly developed market for coke and coke breeze than was at present available. The best solution to that problem was the generation of electricity for their own needs with disposal of surplus energy to the grid.

Mr. **J. Ford,** Inverness, said he would like to know, when the author spoke of joint management, whether he meant at high or low level. Something had been said about over-organisation, but what about under-organisation?

Mr. McDonald's Reply

Mr. **McDonald,** replying to the discussion, said he had been trying to give some information regarding work done for a number of years, and it would have been impertinent for him to tell the Scottish Gas Board how to run the industry after vesting day. On standardised prices one had to remember that in a large undertaking a small increase brought in a fair amount of money but in a small undertaking it would not be enough to meet what was needed. There were industrial crises, and a request for increased payments might cause some firms to turn to other fuel. By losing an apparently uneconomic load it might become necessary to increase the price to the domestic consumer. Each industrial load, even at a small margin, helped to reduce oncosts. On team working, he would suggest one had to use tact and take officials into one's confidence. The difficulty was to get certain large undertakings, which had pride in their achievements, to extend their scope and give their loyalty, not only to their own organisation, but to the group of which they were an integral part. Development was essential to every undertaking, whether grouped or by itself. Isolated undertakings could benefit by central purchasing, thus reducing considerably the amount of capital idle in stores. He could tell Mr. Baird that in none of the groups with which he had been associated had they started with a clean sheet. They had used the existing personnel, and changes had come about through men retiring.